

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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FCC Plan For Baby Bell Under Attack

•OTA Sees Problem Curbing Bell Subsidy

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — A forthcoming congressional study suggests the Federal Communications Commission (FCC) may have considerable trouble preventing AT&T from illegally cross-subsidizing any subsidiaries it sets up to offer unregulated services under the emerging FCC-sponsored restructuring of the Bell System.

The separate subsidiary concept is a cornerstone of the FCC's 1980 Second Computer Inquiry decision on how to allow AT&T to enter unregulated activities such as on-line data retrieval services or intelligent terminal product offerings. But the Office of Technology Assessment (OTA) — in a soon-to-be-published report — noted there is no foolproof way to prevent AT&T from cross-subsidizing the new entities.

While opponents of the Computer II decision have been pushing that viewpoint for some time, the nonpartisan findings of OTA, cou-

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•GAO Also Questions FCC Ability to Monitor

By Bill Laberis

CW Staff

WASHINGTON, D.C. — The General Accounting Office (GAO) has rapped the government plan allowing AT&T to set up a separate computer subsidiary, questioning the Federal Communications Commission's (FCC) ability to monitor relations between AT&T and its "Baby Bell."

A 200-page GAO report, unveiled before the House Subcommittee on Telecommunications last week, concluded that in last year's Second Computer Inquiry decision the FCC "moved too quickly toward implementing the separate subsidiary regulatory scheme, before many of the essential enforcement tools have been fully developed."

The FCC, which is inadequately staffed, will be forced to review relations between AT&T and the subsidiary using auditing techniques "that have proven difficult to apply effectively in the past and imperfect as safeguards against anticompetitive behavior," the GAO said.

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Applications Generator Claim:

'Mark V' Hikes Productivity 50%

By Rita Shoor

CW Staff

NEW YORK — Informatics, Inc. last week introduced Mark V, an on-line applications generator claimed to increase programmer productivity by 50% to 80%.

Outlining the product's features at a media briefing here, Informatics president Dr. Walter F. Bauer described Mark V as an on-line "companion to Mark IV," which is often viewed as an applications generator in the batch processing world.

Designed for IBM Information Management Systems (IMS) data base (DB) and data communications (DC) environments, Mark V runs on

IBM 370, 30 series and compatible hardware under the OS/VS1, OS/VS2 and OS/MVS operating systems. It is a "tool that allows the programmer to concentrate on the application rather than on IMS itself," according to Merritt Lutz, vice-president of implementation systems marketing.

Features such as an automatic interface to IMS DC which includes Message Formatting Service generation and a nonprocedural language are said to eliminate 60% to 70% of the code usually written to handle file, data and environment management and other overhead tasks.

By eliminating the need to repeat a

large block of tasks that are similar for every application, Mark V lets the programmer focus on each application's unique aspects, Informatics said.

Automated IMS calls are executed without user intervention or prompting. This reportedly reduces the amount of formal IMS data base programmer expertise needed to retrieve information from the data base.

"In many instances, programmers who use Mark V need no formal IMS data base and data communications training," Bruce Coleman, executive vice-president of operations, main-

(Continued on Page 7)

DG Unwraps Mid-Range 32-Bit Processor

By Tom Henkel

CW Staff

WESTBORO, Mass. — Data General Corp. last week unwrapped the MV/6000, a mid-range processor that joins its Eclipse MV family of 32-bit minicomputers. The firm also introduced two disk drives for the system.

The MV/6000 — jokingly called the Eaglet by analysts making reference to its big brother, the MV/8000, which was originally code-named Eagle — offers 512K to 2M bytes of main memory, up to 2G bytes of disk storage and support for up to 128 terminals on 25 I/O slots. It is positioned against Digital Equipment Corp.'s VAX-11/750, IBM's 4331-2,

Prime Computer, Inc.'s 550-II and 750 and Perkin-Elmer Corp.'s 3230, DG said.

The processor is both hardware- and software-compatible with the MV/8000, but it is not field-upgradable to the larger processor. It supports DG's Advanced Operating System (AOS) and AOS/VS as well as the firm's Xodiac networking system and offers IBM communications sup-

port through DG/SNA, RJE 80, Hasp II and RCX70.

Under AOS/VS, the processor runs DG's library of 32-bit software. It is also upward-compatible with the firm's 16-bit software, which runs concurrently with 32-bit programs, DG said.

The CPU uses program array logic components and four-way pipelined

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... And CRDS Joins the Fray

By Tim Scannell

CW Staff

NATICK, Mass. — Charles River Data Systems, Inc. (CRDS) last week joined the rapidly escalating attack on 16-bit bastions by unveiling two 32-bit "supermicro" alternatives to Digital Equipment Corp. PDP-11 and Data General Corp. Nova minicomputers.

The Universe 68/10 and 68/80 both incorporate Motorola, Inc.'s M68000 microprocessor and feature Unos, a

user-friendly, device-independent, Unix-like operating system geared for multiuser real-time applications.

The systems feature an optional "data-independent" data base management system (DBMS) that reportedly is similar to DG's Infos, but is completely separate from the user's programs; up to 6M bytes of memory; and Motorola's Versabus, which has an I/O bandwidth twice that of traditional minicomputers and roughly

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DCC Muxes Among Debuts At TCA Show

By Phil Hirsch

CW Washington Bureau

SAN DIEGO — Upgraded statistical and switching multiplexers plus a line of error controllers for asynchronous terminals from Digital Communications Corp. (DCC) of Germantown, Md., were among the product introductions made at the Tele-Communications Association's (TCA) 19th annual conference here last week.

The upgraded multiplexers feature integrated modems offering automatic fall-back capability, analog/digital and local remote loopback, automatic adaptive equalization and a number of other features. Prices start at \$4,030 for the upgraded statistical multiplexers and at \$4,430 for the switched multiplexer line.

Each type of multiplexer is available in a 4,800- and a 9,600 bit/sec

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Reagan Raising Concerns Over Privacy With Revival of Broad DP Matching Plan

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration is preparing a broad computer matching program to identify people illegally receiving government benefits.

The matching techniques, popular with federal agencies several years ago, were sharply curtailed in 1979 for privacy reasons.

Calling those privacy concerns "an excess of caution," Thomas F. McBride, Labor Department inspector general, told the Federal Computer Conference last week the administration plans to spread computer matching use throughout the federal government.

McBride is chairman of a computer matching program initiated by the President's Council on Integrity and Efficiency. The council, dedicated to reducing fraud and waste in federal programs, will "get the word out that this methodology pays off," he told the conference last Tuesday.

The matching techniques were used in 1978 to compare computer tapes of federal employees and state welfare rolls, resulting in a number of indictments of government workers allegedly receiving welfare payments illegally.

Project Match, as it was called, led to a number of similar exercises in other federal and state agencies. The following year the Office of Management and Budget (OMB) established guidelines to assure the matching programs did not violate the 1974 Privacy Act.

Under the privacy law, use of exchange of government data must be compatible with the purpose for which the records were collected. "It

is clear," OMB said in proposing the guidelines, "that matching programs present the potential for significant invasions of personal privacy."

McBride said the President's council will seek a relaxation of those guidelines to facilitate renewed emphasis on matching techniques.

He also said the council will propose legislation to provide more access to tax records. He called legal obstacles to using tax files to fight crime "one of the biggest examples of legislative overkill in the last 10 years."

Too Costly?

One criticism raised three years ago of Project Match and its progeny was that the costs to perform the matches and prosecute those identified far exceeded the money saved by getting those cheaters out of the programs.

The OMB guidelines provided that matching not be used "unless the potential overall financial benefits are demonstrable" and "significantly outweigh" the cost of the match. However, McBride said "I don't pretend they are all cost-effective, indicating it is not feasible to prove in advance that each project will be economical."

In the long run, he said, there is "tremendous dollar potential for computer matching." He pointed to recent matching projects in Memphis, Tenn., and Birmingham, Ala., where hundreds of possible food stamp and welfare cheaters have been identified. "It was big bucks right off," McBride said of those and similar projects.

He attributed much of the outcry against matching three years ago to "premature overpublicizing of the

results," which he said led to expectations of savings that later proved exaggerated. The large numbers of "hits" in some programs far outweighed the number of eventual indictments and made the final results seem disappointing, according to McBride.

Council as Catalyst

McBride said the President's council will work as a catalyst of computer matching programs throughout the government and will try to identify and remove obstacles to use of the techniques.

Besides privacy considerations and legal barriers, he noted there are serious coordination problems in working with the government's "large array of systems." Every federal program has its own set of unique data bases maintained on many different types of equipment, he pointed out.

He also referred to "plain old program obstacles" as "the most pervasive problem of all." He characterized the problem as a bureaucratic attitude of "our job is to spend the money, not to watch it."

Ideally, he said, computer matching should be used not just as "an ex post facto audit tool." It should be used to prevent fraud not just detect it; "the technology today increasingly allows us to do that."

The council is pulling together data on matching programs around the country and setting up working groups to clear obstacles to new matching programs and identify possible matching opportunities. "I'm convinced we're only at the threshold" of matching use, according to McBride.

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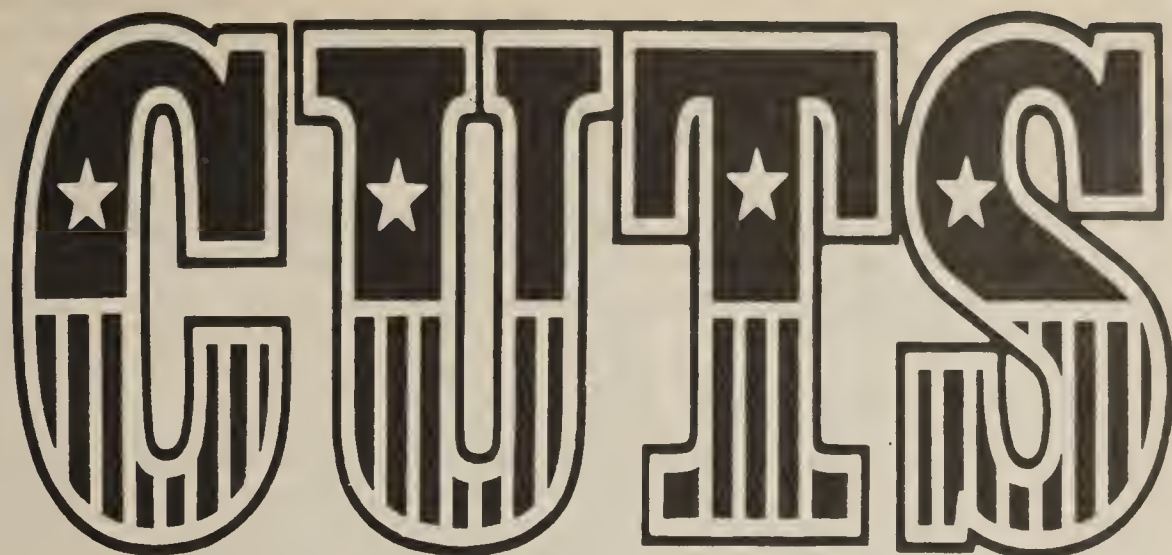
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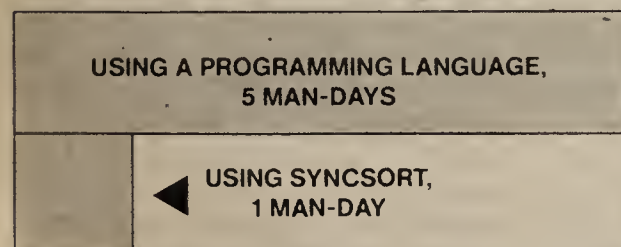
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Chart of the Month:

Programming Time needed for simple applications:



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- 30% in Elapsed Time;

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- SUM—summarizes designated numeric fields.
- INREC/OUTREC—reformats records on input and output.

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And what of the future? *Quo vadis* in these perilous times? Well, SyncSort will continue to lead in cutting your sorting taxes.

We can only hope that Washington will do the same in its field of expertise.

DG Adds Another Member to 32-Bit Family

(Continued from Page 1)
instructions. System cache, 16K-byte and instruction cache memory modules are also included, the vendor said.

The MV/6000 incorporates a three-level independent I/O facility consisting of a 16.6M-byte burst multiplexer channel that handles direct memory access through the disk storage subsystem. Also included is a 2.27M-byte data channel that handles medium- to high-speed devices. Low-speed character-oriented interrupt/sec devices are handled via an intelligent asynchronous controller, also announced with the MV/6000.

The intelligent controllers are two boards that are available only on MV/6000 processors and that reportedly enhance I/O efficiency of character-oriented devices, such as terminals and printers.

Two Versions

The units are available in two versions, an eight-line version for EIA connection with modem control and a 16-line version for direct EIA or 20 mA connection. Asynchronous communication is also possible with the controller, DG said.

The MV/6000 is rack-mountable and can be configured with up to

two internal disk units, either 73M- or 147M bytes, announced along with the system.

The disk drives are Winchester-type units and incorporate a single-board controller design.

The controller on either model can handle another 73M-byte drive or another 147M-byte drive so users can create their own disk subsystems with up to 294M bytes of storage. Both the processor and disks operate off of a single-phase AC power, a DG spokesman noted.

The processors are available immediately. An entry-level system with 1M byte of main memory, a 1,600 bit/in. streaming tape drive, 73M bytes of disk storage, a CRT console, 16 terminals, one intelligent asynchronous controller and a 300 line/min printer costs \$172,000, including an initial license fee for AOS/VS and software support.

A 2M-byte system with one 800- or 1,600 bit/in., 75 in./sec tape drive, two 147M-byte disk drives, 40 CRT terminals, three intelligent asynchronous controllers, one 600 line/min printer, the initial license fee for AOS/VS and software support costs \$293,200.

The 73M-byte disk subsystem costs \$18,000 and the 147M-byte subsys-

DG System	C/350	M/600	MV/6000	MV/8000
Characteristics				
Relative Performance ¹	24	24	26	60
Mips ³	.40	.40	.45	1.4
Memory Size in Bytes (Min-Max)	384K-2M	384K-2M	1M-2M	1M-4M
Purchase Price (Memory Size)	\$56,500 ² (384K)	\$96,000 ² (384K)	\$293,200 (2M)	\$175,900 ² (1M)
Lease Price (Lease Term)	None	None	None	None
Machine Cycle Time (Nsec)	700	700	220	400
Maximum No. Channels	1	1	2	2
Cache (Buffer) Size	None	None	16K	16K
Bus Architecture?	Yes	Yes	Yes	Yes
Price Per 1M Byte Main Memory	\$28,000	\$28,000	\$22,000	\$28,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM System 370/158-3 equalling 45. These numbers are designed to put the processor into perspective with other systems. It is not a buyer's guide. All systems are not alike. They use different

operating systems, instruction sets and architectures, and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. For the processor only.
3. CW estimates.

The DG Eclipse MV Family

tem costs \$24,000.

A 73M-byte add-on disk costs \$14,500 and a 147M-byte add-on disk

costs \$20,500, DG said from 4400 Computer Drive, Westboro, Mass. 01581.

CRDS Attacks 16-Bit Minis With 32-Bit 'Supermicros'

(Continued from Page 1)
70% greater than DEC's 32-bit VAX-11/780 supermini.

In addition, the two Universe computers, which are the first systems offered by CRDS, are priced from about \$18,500 to just under \$40,000 with memory and disk storage. This puts Universe in head-to-head competition with 16-bit computers in the middle to low price ranges, CRDS President Richard B. Shapiro claimed.

In his opening remarks at the firm's first official press conference, Shapiro noted that the two computers coincidentally were being shown on the day of the vernal equinox, a time when the time of day exactly equals the time of night. This, he said, could be symbolic of his effort to have microcomputers finally equal and even surpass the power of minicomputers.

Earlier Debut

Although they were introduced last week, the microprocessor-based systems actually debuted in bits and pieces earlier this year at the National Computer Conference, when CRDS used the shell of the 32-bit system, then code-named JOS, to demonstrate its Unos operating system.

Besides C, the system uses the Pascal, Fortran and Basic languages. In addition, Cobol will be added to the firm's language repertoire.

While the Universe 68's M68000 soul is a true 32-bit microprocessor, with 32-bit data and address registers, it presently has its architectural limitations. Currently, the chip has a 24-bit program counter that limits the microprocessor's address space to a still formidable 16M bytes. However, plans call for upgrading the

counter to a full 32-bits in the near future, a CRDS spokesman said.

Although the system is primarily targeted at the OEM market, the eight-year-old firm is not slighting the end user. A Universe 68/10 with a 7-slot chassis, 256K bytes of memory, an 8M-byte Winchester disk drive, floppy disk, two serial ports and one parallel port costs \$18,500. A Universe 68/80 with a 15-slot chassis, the same memory, an 80M-byte cartridge disk and the same number of ports sells for \$38,500. The Unos software license is priced separately at \$3,000.

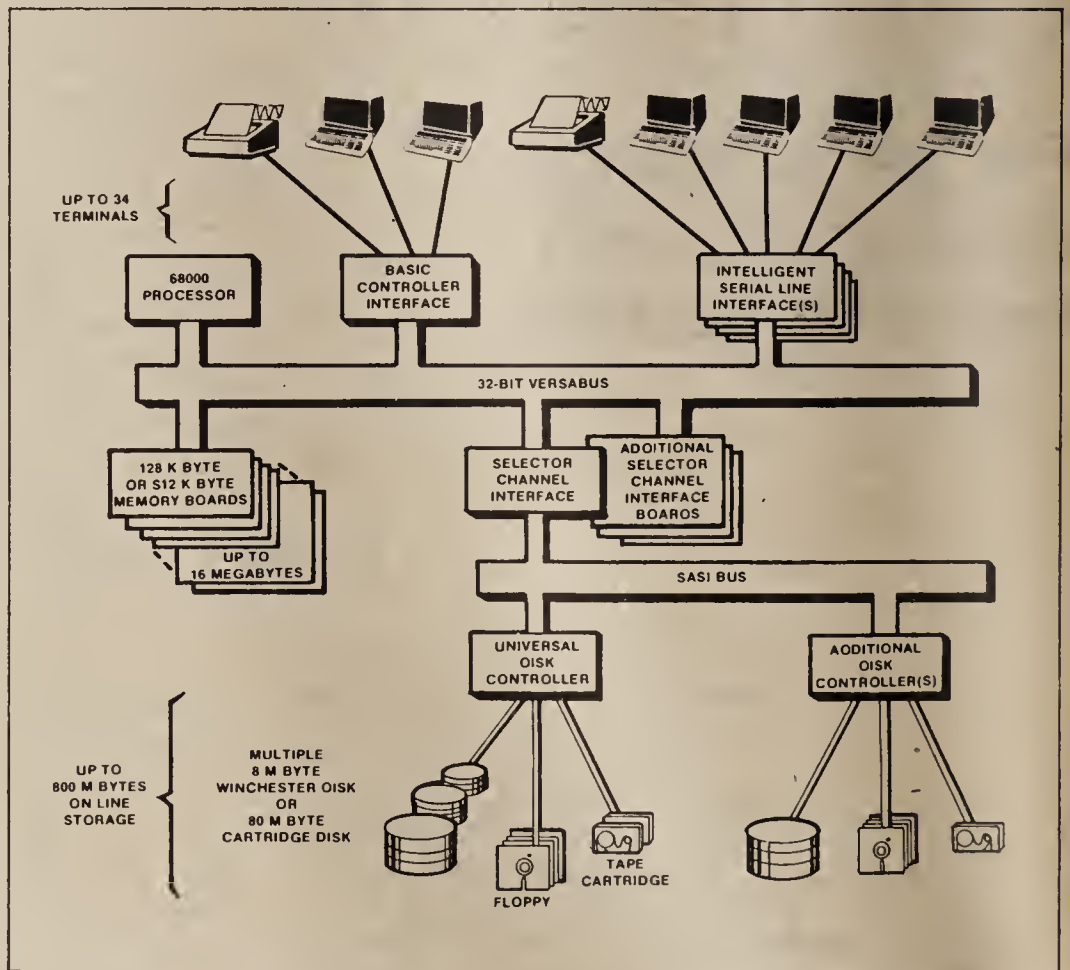
Deliveries of the systems are scheduled for November. However, because they are still in production, the Winchester disk systems will not be ready until sometime in the first quarter of 1982. CRDS is located at 4 Tech Circle, Natick, Mass. 01760.

Unos Similar to (But Different From) Unix

NATICK, Mass. — While very similar to Bell Laboratories' Unix, the operating system for Charles River Data Systems, Inc.'s (CRDS) Universe "supermicros" incorporates a number of enhancements and a few "philosophical differences," according to H. Jeffrey Goldberg, the firm's vice-president of software development.

For instance, while Unix is basically a time-sharing development system, Unos is more user-friendly and aimed at less experienced end users, Goldberg claimed. Unos also has a screen-oriented editor that allows users to take advantage of CRT editing techniques and greater runtime facilities.

One of the major benefits of Unos



Universe 68 System Configuration

— described as a series of operational "pipes" — is that it is written in the C language, Goldberg said.

This language not only offers users enhanced capabilities to modify and maintain system programs, but also makes it relatively easy for them to transfer programs from one computer system to another.

This is particularly true of 16-bit computer users who transport programs to a 32-bit Universe system, Goldberg said. In fact, CRDS' Unos was written on a PDP-11 and transferred to the M68000-based computer in about two weeks.

Another benefit of Unos is its expanded data base management system, which incorporates a synchroni-

zation technique developed at MIT called "eventcounts."

Eventcounts functions much in the same way as a ticket machine used to schedule customers at a bakery or delicatessen, according to Goldberg.

As each program is entered into the system, a priority "number" is assigned and the operating system turns its attention to that program at the designated time.

CRDS' Unos is reportedly the first operating system to employ this type of an event sequencer, which can be expanded to handle real-time network operations.

Up to 34 users can be handled comfortably by either system, Goldberg said.

'Compatible-Base' Architecture

New Firm Has Mini 'Custom-Made' for Unix

By Jeffrey Beeler

CW West Coast Bureau

SANTA CLARA, Calif. — A year-old company based in Silicon Valley joined the minicomputer vendors' ranks last week with the introduction of what is believed to be the first configuration custom-made for Bell's Unix operating system.

Plexus Industries, Inc.'s P/40 is a 16-bit commercial Unix-based system that is said to support more terminals, provide faster response and offer more I/O intelligence than any existing Unix-based mid-range computer system.



The Plexus P/40

In typical configurations, the Plexus system supports five to 15 concurrent users and belongs in roughly the same product class as the Digital Equipment Corp. PDP-11/45. However, in maximum configurations, the P/40 can accommodate up to 24 users and rival the processing power of such high-end minicomputers as DEC's PDP-11/70, Data General Corp.'s Eclipse models and Hewlett-Packard Co.'s 3000 series.

While other micro- and minicomputer-based systems utilize Unix and similar software, the P/40 is reportedly the first to use the operating system as a base and actually build hardware around its capabilities.

Intended both for volume end users and OEMs, the business-oriented mini system uses a "compatible-base architecture" that combines multiple dedicated processors with Intel Corp.'s Multibus peripheral controller. Together, these and other architectural features like storage module device (SMD) interfaces enable the 16-bit system to maximize Unix's advantages and minimize its disadvantages, Plexus claimed.

According to Plexus, some of the inherent Unix shortcomings that the design of the P/40 overcomes are:

- The operating system occupies a great deal of main memory and hardware resources.
- It is ill-suited to processing interrupts.
- It requires very high data transfer rates to avoid serious hardware degradations.

To compensate for these drawbacks, Plexus first developed a proprietary architecture that distributes machine intelligence throughout the system by assigning to each of its controllers a dedicated microprocessor and up to

48K bytes of local memory. A fully configured P/40 incorporates up to eight microprocessors, including a Zilog, Inc. Z8000-based CPU, three intelligent communications processors, a disk controller, a tape controller and two spares capable of supporting additional peripherals, the spokesman said.

The other two methods of maximizing the P/40's performance and throughput consisted of providing the system with a memory management scheme and equipping its architecture with a direct-memory access channel that transfers up to 3M byte/sec, the source said.

The current system provides up to

1M byte of central storage. However, Plexus reportedly plans quadruple that storage capacity in the near future. A minimum P/40 configuration consists of a 256K-byte CPU, 72M- or 145M-byte Winchester disk unit, nine-track tape unit and communications processor with eight serial I/O ports, each capable of supporting a terminal running at up to 19.2K bit/sec.

The configuration also incorporates the Multibus controller and SMD-type interfaces, which together support a wide variety of third-party peripherals, including line and character printers, diskette systems, card readers and Ethernet links.

As processing needs grow, the

minimum configuration can be expanded with up to three 256K-byte increments of main memory and two additional eight-port communications controllers, for a total of 24 terminal channels.

A typical eight-user P/40 configuration consisting of a 512K-byte CPU, 72M-byte disk unit, nine-track tape unit and communications controller is priced at \$49,500, excluding terminals.

A Unix license supplied by Plexus as a distributor costs an additional \$5,000.

The first P/40 has already been shipped from Plexus at 2230 Martin Ave., Santa Clara, Calif. 95050.

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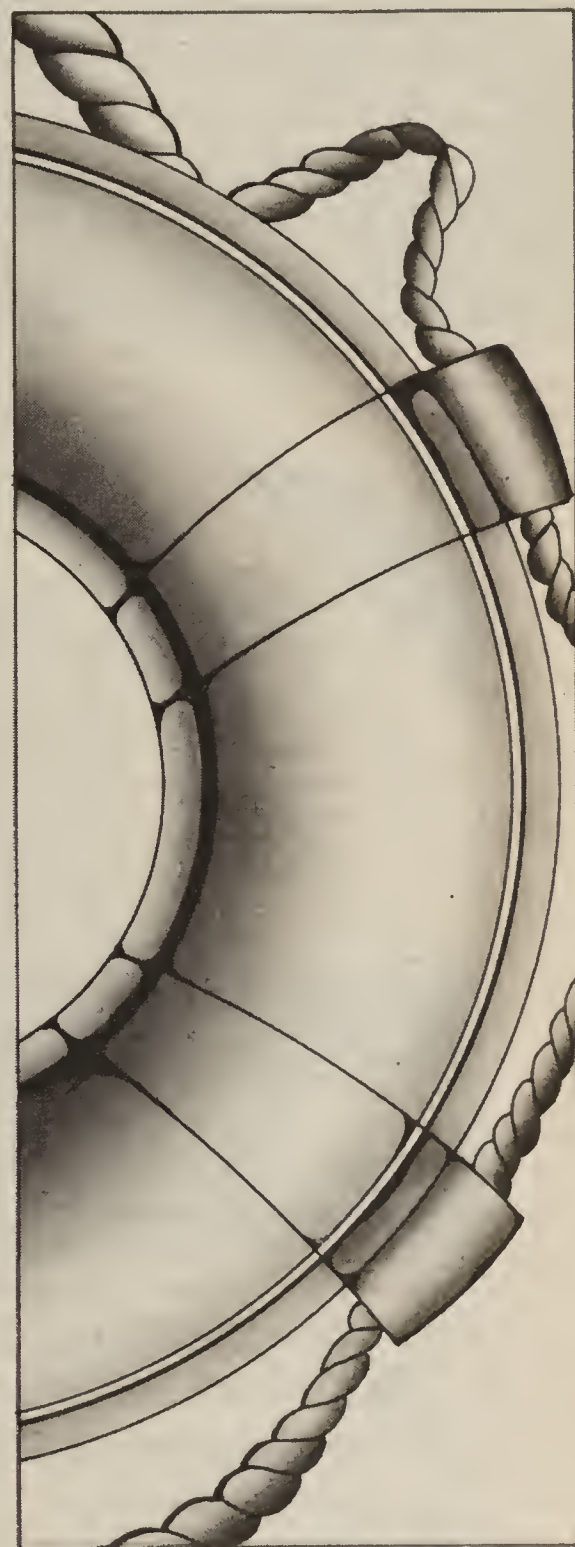
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CW 92881

Disagrees With Key Issues of Bill

Wirth Report Coming, Could Change S. 898

By Phil Hirsch

CW Washington Bureau

SAN DIEGO — A report that could profoundly impact the telecommunications legislation now being drafted in Congress will be issued within 10 days, Rep. Tim Wirth (D-Colo.) said last week.

He declined to discuss any of the report's conclusions, but did indicate that it will disagree with key concepts underlying S. 898, the "communications act rewrite" bill recently drafted in the Senate.

Wirth, chairman of the House Telecommunications Subcommittee, mentioned the upcoming report in the course of a talk he gave at the 19th annual conference of the Telecommunications Association (TCA) here.

port being prepared by the House subcommittee was designed to fill that void. The subcommittee will un-

CW at TCA

veil its rewrite of the 1934 Communications Act "late this fall," Wirth said.

He indicated that the report's main purpose will be to justify legislation requiring much slower deregulation of AT&T products and services than is specified in the Senate bill. It is also possible the House measure will require a greater number of services

to remain permanently regulated.

Wirth did not criticize S. 898 directly, but he made it clear the House Telecommunications Subcommittee has given users and user groups much more opportunity to express their views. One result is that the upcoming House bill will require a greater amount of competition to be present or likely in a particular market before deregulation is allowed.

The importance of the effort now under way in Congress to write a new communications act is underlined by the shift of the U.S. from a nation of "country roads to electronic highways," as Wirth put it.

Although this change makes feder-

al support of high-technology research and development and scientific education more important than ever, the Reagan administration is moving in the opposite direction. According to the Colorado congressman, most federal aid in this area has been cut 60% and support of the training of computer scientists has been reduced 70%, he said.

Former President Gerald Ford gave the keynote speech. "My impression, based on conversations with influential members of Congress, is that a communications bill will be sent to the White House before the 97th Congress adjourns," (that is, before the end of 1982), he said.

OTA Sees Problem Curbing Bell Subsidy

(Continued from Page 1)

plished with similar conclusions by another congressional agency, the General Accounting Office (see accompanying story) could have great influence on efforts to amend the 1934 Communications Act.

The OTA report was requested by the Senate Commerce and Judiciary Committees, the key players in that body's communications legislation

efforts. The committees are now putting finishing touches on amendments to fine-tune a recently completed AT&T restructuring bill.

"The creation of subsidiaries per se is an inadequate safeguard against cross-subsidization," concluded OTA, which under its mandate does not offer recommendations to Congress, but only suggests probable consequences. "At a minimum, an arm's-length relationship with incentives to operate independently is required," OTA continued. "Even so, there is a question of how possible it is in actual practice to provide effective separation between affiliates of the same company."

Divestiture Cited

Noting "creation of one, two or several new AT&T subsidiaries may not make AT&T any less dominant in the short term," OTA said only divestiture will completely do away with cross-subsidization fears. But, OTA said, the ongoing federal antitrust action against AT&T is "the only plau-

sible force" for divesting AT&T of any of its manufacturing, research and development or operating branches.

On what subsidiary options available to Congress would offer the best protection against cross-subsidization, OTA said: "An arm's length, fully separated subsidiary with a different board of directors, restrictions on employee stock plans, separate nonrotating management, a prohibition on common ownership of facilities and other such measures would clearly represent a higher barrier to cross-subsidy than a simple subsidiary.

"A requirement that the parent and the subsidiary deal with one another on the same basis as they deal with nonaffiliates, plus the requirement that the parent furnish facilities under tariff on a nondiscriminatory basis and not establish restrictions on resale would raise the barrier between the parent and the subsidiary still higher."

GAO Doubts FCC Ability To Monitor Bell Subsidiary

(Continued from Page 1)

Therefore FCC decisions on issues concerning the telecommunication industry's transition to a more competitive structure could unnecessarily raise user charges, the study contends.

The study supports criticisms fired by opponents to the subsidiary approach after a federal judge recently upheld the Inquiry II decision [CW Sept. 14].

The study is also certain to have an impact on the communications bill pending in the U.S. Senate, a bill that advocates a similar subsidiary approach to AT&T's entry into unregulated equipment and service offerings.

Sparing no one, the GAO study lashed out at the Senate plan as well. That plan would allow the subsidiary to construct its own transmission lines. The GAO argued this would encourage AT&T to pour new line construction funds into the subsidiary, leaving the old lines, which AT&T's telecommunications compet-

itors must use, to languish.

"The most distinguishing feature of the separate approach is that it does not directly affect or significantly alter the incentives of a firm possessing monopoly power to abuse that power for anticompetitive ends," the GAO said.

As it stands, Inquiry II would allow AT&T to provide "both enhanced [computer-based] services through a single, conglomerate subsidiary," the report argued. "Such a subsidiary would be endowed from the moment of its creation with a massive size, pervasive dominance and a significant potential for abuse of market power."

FCC Chairman Mark S. Fowler told the subcommittee most of the GAO's recommendations and observations "are sound." However, he added, the GAO's criticisms are aimed more at the FCC's "management failures" than anything else. He vowed to tighten the commission's internal management to deal with challenges of Inquiry II.

Little Information

Although S. 898 relies heavily on competition to maintain reasonable rates and fair access to communications services after present regulatory restraints are relaxed, very little hard information has been developed to show how competitive specific telecommunications markets really are or are likely to become, Wirth explained. The upcoming re-

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CCA's Model 204 DBMS Gets Data Dictionary

By Rita Shoor
CW Staff

CAMBRIDGE, Mass. — Computer Corp. of America (CCA) has introduced a data dictionary for its IBM-compatible Model 204 data base management system (DBMS).

"This is a completely new product," said Paul Fay, manager of CCA's data base product support area. The dictionary replaces an earlier CCA product that was "much more a basic text and documentation tool" and is no longer being actively marketed.

The new dictionary was built for IBM 360, 370, 4300, 30 series and compatible systems running under the OS, VS1, VS2, SVS and MVS operating systems.

'Ideal Tool'

Claiming that it is an "ideal tool for managing the entire corporate data resource," a CCA spokesman pointed out that the product records data about installation-standard entities, including groups, files, records, fields, systems, jobs and programs as

'Mark V' Claims 50% to 80% Boost

(Continued from Page 1)

tained. "That should relieve the strain on DP operations struggling with shortages of experienced programmers."

The software is initially targeted toward "major IMS/DC high-production, high-volume applications where systems are large and sophisticated," Coleman said.

Efficient Utilization

Efficient resource utilization gains greater importance in this type of environment and the machine language code produced by the Mark V compiler has performed "at least as well as" machine code generated by Cobol and/or PL/I programs in production applications, according to Lutz.

Utilizing a screen-painting approach that allows the programmer to lay out screens as they will actually be positioned in the completed application, Mark V is said to aid in the application prototyping process by giving the end user a "graphic, visual preview of the final system," he explained.

Available immediately, Mark V is priced at \$100,000 for the basic model.

Informatics is headquartered at 21050 Vanowen St., Canoga Park, Calif. 91304.

well as data handled by the Model 204 DBMS.

Other features include:

- Full-screen data entry and display, allowing all dictionary functions to be handled through the menu-oriented user interface.

- Standardized reports and a browsing capability to provide centralized documentation of the data resource.

- Seven levels of security to control both information access and dictionary updating capability.

Among the product's data base integration functions are automatic data base file space calculations and generation of Model 204 file creation and definition commands.

The dictionary's menu-oriented re-

porting facility allows users to either generate reports at a terminal or route them to a printer, according to a spokesman.

Displays offered via the reports' menu include all information for a specific entity with a cross-reference option and an alphabetically ordered inventory of all information contained in the dictionary.

Users can also display relationships between any specified entities and browse through the dictionary for key-word occurrences, the spokesman explained.

Maintaining that the dictionary was set up to be adaptable to varying installation documentation and control requirements, the CCA spokesman said it could be utilized from initial

system design through development to final implementation and maintenance.

Standard Terminology

The installation entity definition facility, for example, allows users to model any design and development methodology structures with standard terminology.

This allows the dictionary to be used as a sort of development scratch pad with system definitions becoming more detailed as development proceeds.

Available immediately, the Model 204 data dictionary costs \$20,000, the spokesman said. CCA is located at 675 Massachusetts Ave., Cambridge, Mass. 02139.

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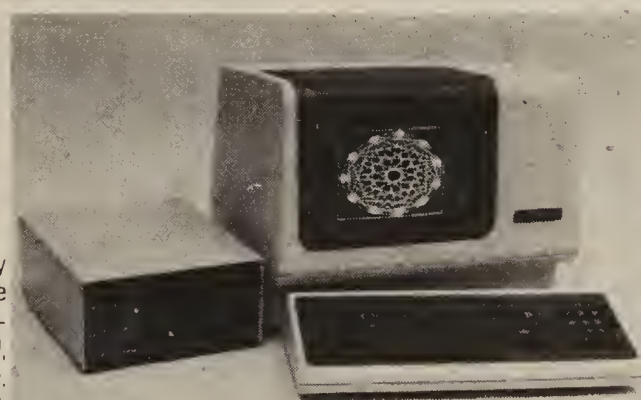
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A Good Idea Is Where You Find It. And When.

Where you'll find the Graphics VT100 up and running is at National Computer. Call any one of our local offices, a demonstration will be scheduled.

Corrections

The name of the vendor in "Sojitec System Mixes Graphics, Text Capabilities" [CW, Sept. 14] was misspelled. Its correct spelling is Sogitec.

John Coleman directs management information systems for Iowa Beef Processors, Inc., not Iowa Processors, Inc. ["DPers Knock Sales Hype, Look for Technical Savvy," CW, Sept. 7].

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GM Model: Tougher Auto Standards Pollute

"One glass of wine, two drinks of gin,
And I'm lost in the ozone again."

From 1960s song by
Commander Cody and the
Lost Planet Airmen

By Bill Laberis
CW Staff

DETROIT — Stricter automobile pollution standards could result in higher rather than lower pollution levels, according to a computer model constructed by scientists at General Motors Corp. (GM) Research Laboratories here.

The model shows that nitrogen oxide (NOx) emissions, which are to smog what flour is to bread, exhibit a strange "Jekyll and Hyde" behavior that has clear implications for federal automotive control strategies, GM claims.

The findings have a definite timeliness. The federal Clean Air Act of 1970 is destined for review early next year, with the Reagan administration gunning for a wholesale rewriting of some of its more restrictive clauses.

The Environmental Lagrangian Simulator for Transport and Atmospheric Reactions (Elstar) was written in Fortran IV and executed on GM's IBM 3033 CPU. Its results show that, under different conditions, NOx can both inhibit and promote ozone formation in the lower atmosphere. Ozone is a bluish, irritating and smelly gas and, like NOx, is a primary ingredient of smog.

Smog Chambers

"We've studied the role of NOx in smog formation primarily by using smog chambers," said Dr. Richard Klimisch, head of GM's Environmental Science Department. "Some experts say that smog chamber simulation is too simple to adequately model the reality of the atmosphere."

"More recently, we carried out mathematical simulations using a computer model that contains a realistic treatment of emissions and meteorology along with a great deal of chemical detail," he explained.

Elstar simulates photochemical reactions for 39 different chemical species

in an air parcel that moves along a trajectory determined by the local prevailing winds.

Klimisch said the model follows a column of air from downtown Los Angeles through the San Gabriel Valley to the west and eventually to San Bernardino.

The model's conclusion: The more you lower the NOx levels in the Los Angeles Basin, the higher the ozone concentration.

"We think this trade-off of lower NOx levels for higher ozone is a poor pollution control strategy," Klimisch said.

Upgraded Muxes Among Debuts at TCA

(Continued from Page 1)

version. The former provides automatic fall-back to 2,400 bit/sec, the latter to 7,200 bit/sec and then to 4,800 bit/sec if the transmission line cannot support communications at the higher speeds.

The new error controllers, designed for such asynchronous devices as CRT terminals and teletypewriters, detect and correct noise- and distortion-induced transmission errors through the use of a bit-synchronous protocol that features a 16-bit cyclic redundancy-check algorithm. No change is needed in existing systems, according to DCC.

The EC9400 error controller is inserted between an already installed terminal and modem. Support is provided for operation over dedicated and dial-up circuits at any of 16 bit rates from 50- to 9,600 bit/sec, utilizing any of several 5- or 8-bit transmission codes.

The EC9400 alone costs \$995; the price is \$3,225 with an integrated 4,800 bit/sec modem and \$4,495 with an integrated 9,600 bit/sec modem, DCC said.

Other Debuts

Several other new or upgraded telecommunications products were also unveiled here last week. They included:

- A network management system from Intertel, Inc. of Andover, Mass.
- "No-frills" data concentrators from Micom Systems, Inc., Chatsworth, Calif.
- A large-capacity electronic pri-

vate automatic branch exchange (PABX) from Northern Telecom, Inc. of Nashville, Tenn.

- Modems from Kinex Corp. of Largo, Fla. and Prentice Corp. of Sunnyvale, Calif.

- A network control system from Penril Corp., Rockville, Md.

- Network diagnostic hardware from T-Bar, Inc., Wilton, Conn.

- A switching statistical multiplexer/data concentrator family from Timeplex, Inc., Rochelle Park, N.J.

Intertel's 90/10 network management system, which features a color graphics display terminal, provides a variety of monitoring, diagnostic, and restoral capabilities. Information is displayed in real time and also is stored in memory. A spare modem is included. It "provides for 99% uptime," according to the company.

Micom's no-frills data concentrators consist of three low-cost add-ons to the company's Micro 800 line. In each case, switch-selectable asynchronous composite output rates of 9,600-, 1,800- and 1,200 bit/sec are standard. Prices: \$1,050 for Model 822-NF, a 2-channel concentrator; \$1,400 for the 4-channel 824-NF; and \$2,200 for the 8-channel 828-NF.

Northern Telecom's new SL-100 large-capacity PABX was designed to be compatible with a variety of data terminals and networks. The latter include X.25-based packet nets as well as local-area networks.

The related network interfaces are "currently under development and should be available within a year," a company spokesman said. The SL-

100 reportedly can serve terminals up to 50 miles away, thus permitting one SL-100 to replace multiple existing PABXs.

A CCITT V.29-compatible modem, designed to operate over four-wire unconditioned domestic circuits and international leased voice-grade lines, was unveiled by Kinex Corp. The K9600, in its basic configuration, provides full-duplex, point-to-point communications at 9,600 bit/sec. It can be expanded to include up to four independent ports operating at 7,200-, 4,800- or 2,400 bit/sec.

Prentice's new Trimodem is compatible with Bell's 103S and 212S as well as Vadic's 3400 series modems. The Trimodem features a microprocessor-controlled busy/out circuit that buffers the busy/out signal so as not to interrupt ongoing communications. The Trimodem also provides continuous automatic self-test capability when in the idle mode, as well as automatic or manual answering service.

Penril's new Diagnostic and Network Monitoring (Dinemite) system was designed to be upwardly expandable, allowing the diagnostic capabilities at each remote modem site to evolve, in modular fashion, into a centrally-controlled system. Dinemite features a software-based "help file," which, according to the company, makes it easy for nontechnical personnel to monitor the system and test for trouble.

DCR System

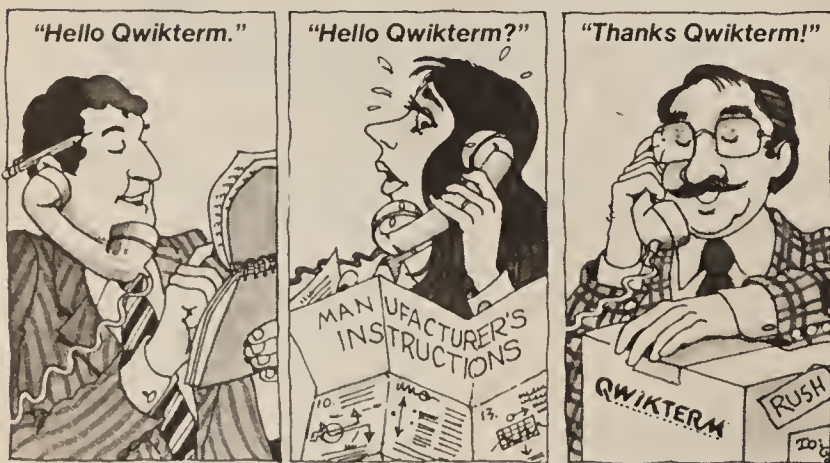
T-Bar's diagnostic hardware is called the Explorer Data Compression Recorder (DCR). The company said it is "a very powerful and efficient mass storage tool designed to assist the communications engineer in isolating hardware, software or protocol problems."

The Explorer DCR features 25 record and playback speeds from 50 bit/sec to 56K bit/sec. The technician can record at 56K bit/sec and play back at any other supported speed or utilize a frozen frame mode while he analyzes the data stream with Digital data link testing equipment.

A switching statistical multiplexer/data concentrator family from Timeplex is said to support up to 144 ports with the advantage of automatic and manual switching. Designed for distributed data switching, the Switching Microplexer models feature the port selection mode that allows a port to automatically or manually call another port or contention group through an interactive sequence, the vendor said.

Each port is user-programmable to be either dedicated or switched and switched ports may operate in either the port contention mode or port selection mode, the company claimed. The Switching Microplexer models are priced starting at \$2,800.

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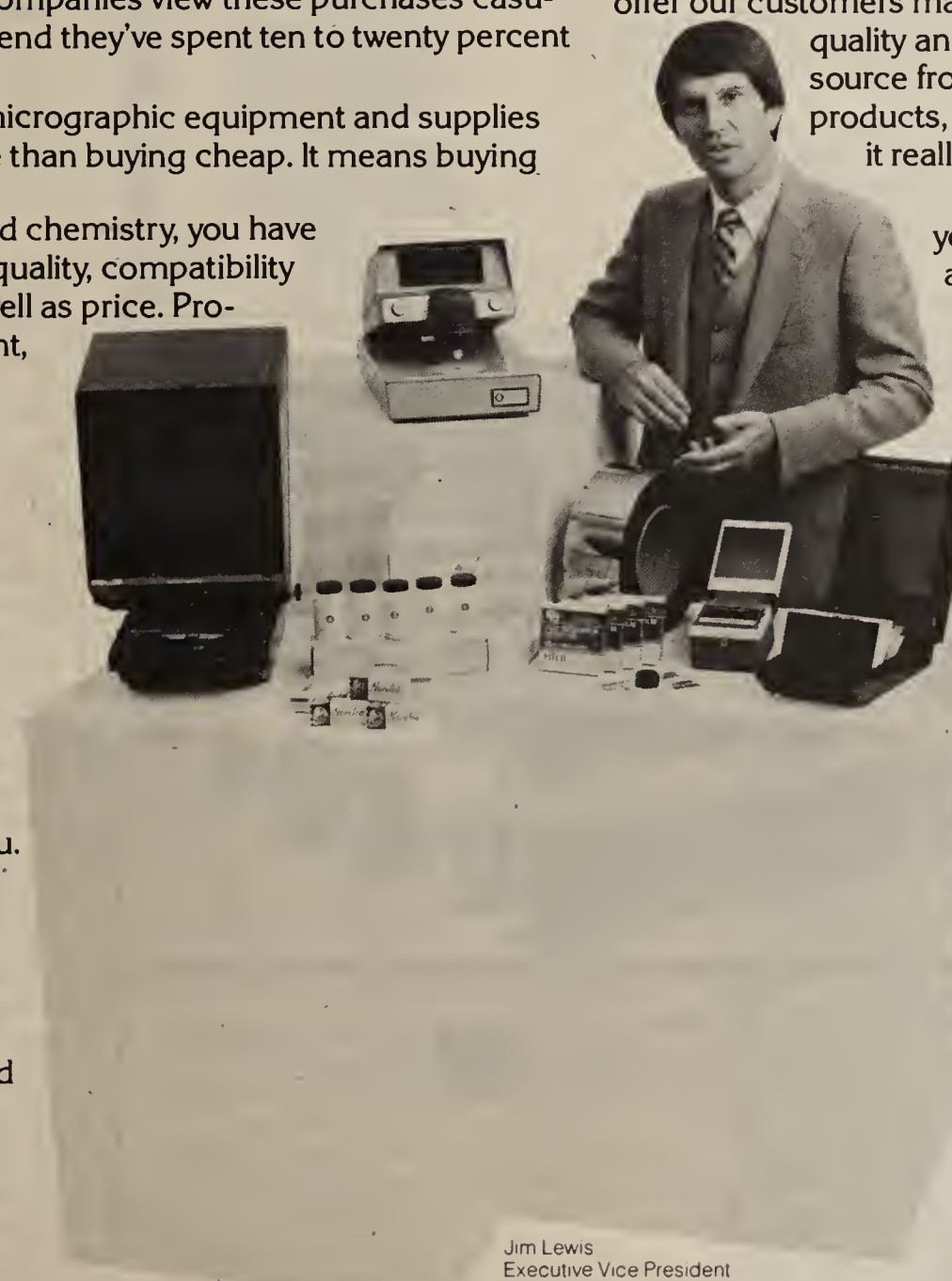
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Both for and Against the Company

Poll Finds Trade Press Coverage of IBM Biased

By Brad Schultz
CW New York Bureau

The DP trade press has produced biased coverage of IBM — coverage biased both against and for the industry giant, according to most who answered a *Computerworld* poll of DP managers last week.

Several of the 14 surveyed managers called the trade press biased against IBM, but a few called the press slanted in favor of the world's largest computer supplier. This was in response to CW's question "Do you perceive any persistent biases in the trade press?"

The respondents run DP for six manufacturers, two financial institu-

tions, two transportation companies, two city governments, a retailer and a research company.

Charles Farrington, who runs computing for the City of Tuscon, Ariz., named another sort of bias. Vendors sometimes pressure users into giving trade reporters a story biased in the vendors' favor, the computer services director asserted.

Most of the DP managers said they spend one to three hours each week on reading and thinking about articles in DP journals. Most said they need about three different kinds of journals to stay abreast of technological and industrial developments in DP.

The primary on-the-job benefit of trade journals, most of the managers told CW, comes from coverage of product announcements, especially when new products are compared to existing competitive products. The second most important benefit comes from coverage of approaches toward applications and implementations, the phone survey indicated.

Unlike most of the respondents, DP manager Winfrey L. Grymes Jr. complained that the trade press overemphasizes products aimed at IBM customers. DP journals should provide more details on products for customers of other systems vendors, he remarked at Schluderberg-Kurdle, Inc.

— a Univac user in Baltimore.

At Local Federal Savings and Loan in Oklahoma City, Vice-President Pat Hunt agreed that IBM coverage seems to take precedence over coverage of other suppliers in DP journals. "But no more so than IBM's domination of the marketplace," he added.

At Gulf States Paper Corp. in Tuscaloosa, Ala., Kenneth Tobola said a "general anti-IBM bias" was "very obvious" among DP journalists. But the information services manager also charged the trade press with undue emphasis on smaller systems and smaller vendors.

Tobola suggested that the press covers IBM in at least two ways: from the standpoint of products and applications, and as a force for good or evil in computing. He complained that IBM does not get enough press attention on products and applications, but draws a lion's share of flak from reporters who dig for intrigue, scandal and drama.

Requesting anonymity, the systems director for a Missouri-based automotive manufacturer also charged trade journalists with an anti-IBM bias, but stated that IBM's status as the largest computer vendor inherently makes the company more vulnerable to "shots" from the press.

A number of the DP managers who called the press anti-IBM also said they did not mind this alleged bias. The Missouri systems director said the bias was "not offensive and I still get a kick out of it."

Asked "What could the trade press do to improve coverage," he recommended more intensive coverage of management issues in computing. "DP management and management are one in the same," he declared.

More 'Highlighting'

At Zenith Radio Corp. in Chicago, systems director Tom Buchsbaum recommended that trade journals offer more "highlighting" of issues — summarizing at the front of a journal what issues are addressed by its articles. If a newspaper featured such summations in just two pages, Buchsbaum noted, readers could immediately scan the two pages and more prudently budget their reading time.

At the EW Ferry Screw Products Co. in Brook Park, Ohio, DP director Tom Michel said he receives too many different kinds of trade journals and newsletters. He would prefer a situation where one or two journals covered the full range of topics germane to his job. But publishers have not made one or two DP journals that comprehensive, he indicated.

Despite such criticism and charges of bias, none of the polled DP managers suggested the trade press was doing a poor job. To improve coverage, the press should try to rely less on public relations people and other vested interests, according to DP manager William Lewis at the City of Anchorage in Alaska.

His counterpart in Tuscon, Charles Farrington, recommended that trade journals gather comments from users over a period of six months on a particular topic, rather than taking snapshot polls.

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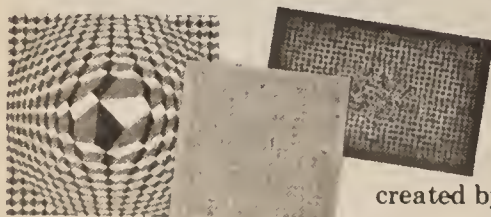
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Store/Forward Unit For Digitizing Voice —IBM's in Mail Mart

ATLANTA — IBM hung yet another shingle on its door last week when it entered the voice electronic mail market with the IBM Audio Distribution System.

Based on the Series/1 processor, the audio store-and-forward system can store digitized messages for later retrieval, allowing users to communicate through audio messages that retain the identity and voice inflections of each user.

The message can be stored, retrieved, edited and transmitted via a conventional tone-generating telephone or dial telephones equipped with commercially available generating attachments, IBM said.

A user can record his message on the system and store it on the Series/1 disk, from which it can be retrieved by

one or more subscribers designated by the user.

The system automatically compresses pauses to give a smoother flow of words, IBM claimed, and messages can be stored short-term or long-term.

Each user can predetermine up to 25 distribution lists of 10 names each and automatically send messages to people on the list as well as to those on other lists, a spokesman noted.

Three Programs

The Audio Distribution System consists of three licensed programs operating in conjunction with a Series/1 that includes a 512K-byte dedicated Model 4955/F00 processor.

The system connects to either a public or private telephone network through two

Voice/Data System —AJ's in PABX Field

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) last week became the latest telecommunications vendor to announce a digital voice/data private automatic branch exchange (PABX) system.

The IOX-1000 Integrated Office Exchange, the first of a series of modularly expandable systems that the firm said it will introduce over the next two years, reportedly allows voice and data communications between on- or off-site peripheral devices at speeds up to

FCC 'Passive' In EFT Debate

CW Washington Bureau
WASHINGTON, D.C. — The Federal Communications Commission (FCC) probably does not have jurisdiction to determine if the Federal Reserve communications system improperly stifles private-sector competition in electronic funds transfer (EFT), Commission Chairman Mark S. Fowler told Congress recently.

Fowler told the House Government Information and Individual Rights Subcommittee that the FCC would probably not look into the matter unless a formal complaint is filed.

"We're more in a passive mode," Fowler said. "The commission does not now monitor the existing communications services of other federal agencies."

64K bit/sec. The system now has a capacity of 1,024 ports.

In addition to a CRT console and a digital switch processor, the system features the company's Digi-Touch telephone containing a microprocessor for controlling telephone functions, a codec for digitizing voice signals, memory and circuitry required to send and receive signals to the switch processor.

The phones can be upgraded by adding data option boards with standard RS-232 connectors for high-speed data communications without the need for modems, the company claimed.

"This second-generation telset provides a truly digital switch capability right from the user's desk and permits both voice and data to flow through the same system," according to Edward A. Burfine, division manager.

The IOX system provides the capability for simultaneous speech and data for up to 930 users without reduction of ports.

It supports both synchronous and asynchronous data communications at rates from 110- to 19.2K bit/sec, he said.

With shipments scheduled to begin the second half of 1982, the IOX is priced between \$800 and \$1,000 per connection and an additional \$200 for the data capability from Anderson Jacobson at 521 Charcot Ave., San Jose, Calif. 95131.

New York Sprucing Up Coliseum As Info 81 Readies for Oct. 12 Opening

NEW YORK — When the Information Management Exposition & Conference (Info 81) opens at the New York Coliseum Oct. 12-15, discussions will run the gamut from how to start out in office automation to how to implement world networks.

This year's Info will focus on "Increasing the Responsiveness of Information Systems" and will include sessions on DP management, data base technology and management and prepackaged software in systems applications, a spokesman said. An estimated 25,000 attendees are expected at the conference, compared with last year's record 22,000-plus attendance.

Keynoting the conference will be Donald J. Massaro, Office Products Division president and executive vice-president of Xerox Corp., who will speak on increasing office productivity.

The exposition is expected to include 250 to 300 vendors demonstrating their prod-

ucts, an increase of 25% from the 1980 floor show. The exhibit will occupy three floors of the coliseum and automated consultancy centers will be available on each floor to help attendees locate products in their interest areas.

Multinational Firms

The eighth annual Info will also feature a conference on "Information Management for World Companies," which will address the information problems of companies that conduct multinational business. The special three-day conference will convene at the Plaza Hotel and a registration fee of \$1,000 is required.

The conference fee for Info 81 is \$350, which includes entry to the exhibit floor and the regular sessions. More information on the conference is available from its sponsor, Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10167.

Series/1 I/O devices, also announced with the system.

The Telephone Communications Controller and the Telephone Communications Adapter provide voice digitization and logical data control functions.

The controller provides the control and data transfer function for one to three adapters, IBM said.

Configurations can include two to 10 telephone ports from two to eight disks with a total storage capacity of

500M bytes.

The system will be available in February and will range in price from \$115,000 to \$235,000, IBM said. The system is marketed through IBM's General Systems Division.

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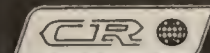


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Can't Compare CNA, SNA, NCR Tells Users

By Bruce Hoard
CW Staff

SEATTLE — Comparing NCR Corp.'s Communications Network Architecture (CNA) to IBM's Systems Network Architecture (SNA) is like comparing "apples to Chevy pickups." That was the message NCR Comten, Inc.'s Gary R. Van Tassel delivered to attendees at the Comten Users Exchange (CUE) conference here last week.

Van Tassel, manager of communications architecture for NCR Comten, made it clear the still-developing CNA will not be a replacement for the pervasive SNA. However, he stressed that there is plenty of room in the communications industry for competition.

Calling CNA a "business plan" more than an architecture, Van Tassel said it is also a set of technical

CW at CUE

specifications that define the distribution of functions within network components and the rules for communicating.

The crying need for standardization within the computer and communications industries is a prime force behind CNA development, he said. CNA is being designed to standardize communications methods and services across all NCR and NCR Comten products so both firms will

be able to interconnect their products with common carriers and other vendor offerings.

Prior to CNA, NCR was unable to adapt dominant communications methods and protocols, he said, adding the giant company definitely wants its equipment to operate in an IBM environment.

Although he admitted he was not divulging a lot of technical information on the emerging architecture, Van Tassel did reveal that a development manual will be available in the near future.

The list of services CNA must provide includes the ability to integrate data, voice, image and text; access to new communications offerings; easy migration for terminals and applica-

tions and optimal network performance in terms of dynamic allocation of bandwidth; least cost routing; and resource sharing, Van Tassel declared.

NCR also hopes to offer a user-friendly interface and the ability to manage networks in terms of defining, operating, changing, securing and maintaining them. He stressed that some capabilities are still far from being realized, but "having some kind of plan is better than having no plan at all."

Van Tassel made it a point to distinguish between the words "architecture" and "implementation." Architecture, he said, defines common functions, external interfaces and how parts of a system relate; implementation involves developing products that perform the functions defined by the architecture by applying structure and technology.

Besides SNA, CNA also has to take under consideration IBM's Binary Synchronous Communications protocol and start/stop terminals, according to Van Tassel. "Bisync and start/stop are going to be with us for a long time and we can't ignore them," he said.

Other application and networking environments to which CNA hopes to provide NCR users access include CNA networks to public data networks and CNA networks to networks in compliance with the CCITT X.21 and X.25 recommendations, he explained.

Driver Register Gets Reprieve

CW Washington Bureau

WASHINGTON, D.C. — The Department of Transportation's (DOT) National Driver Register, a controversial telecommunications system for state exchange of driver's license records, has received a temporary reprieve from Reagan administration budget-cutters.

In approving transportation appropriations legislation earlier this month, the House of Representatives added an amendment to provide \$1 million to keep the register operating through fiscal 1982. DOT had recommended that most of the funds for the system be cut from the budget [CW, June 29].

The amendment was proposed by Rep. James Oberstar (D-Minn.), who earlier this year introduced a bill to upgrade the register to a nationwide on-line system.

Oberstar asked for the amendment to keep the register in operation until his bill and a companion Senate bill can be considered.

The register is used by state licensing authorities to exchange information on the driving records of license applicants.

The present system is computer-assisted, but relies too much on mail to provide timely records exchange, proponents of the system upgrade argue [CW, Jan. 12].

The administration decided it would not be economically feasible to make the system more effective in the face of state reluctance to participate.

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Not Full Communications Link

X.25 for Packet-Switched Nets Seen Incomplete

By Bruce Hoard
CW Staff

SEATTLE — "Connectivity" — not communications — is what X.25 on packet-switched networks promises, according to Woody Collins, senior product manager for NCR Comten, Inc.

Discussing the advantages and disadvantages of the X.25 interface and packet switching at the Comten Users Exchange (CUE) here last week, Collins said one of X.25's disadvantages is its incompleteness. It is not a full-fledged communications link because it addresses only three levels of communication — the physical, link and procedural levels.

What these levels do is to establish a link; they do not guarantee that the two links will communicate, he said. Furthermore, an X.25 interface does not connect one device to another without an intervening network, he asserted.

These weaknesses are countered by certain strengths of telephone companies, which offer an alternative to X.25, and the packet-switched networks that utilize the interface, according to Collins. "Because the various telephone companies have pretty much standardized communications and agreed to a standard protocol, it is possible to pick up your phone and dial anywhere in the world," he said.

Reduced Costs

Packet-switching networks are touted for their reduced costs and increased utilization, Collins observed, and they also present users with the ability to share communications lines.

Circuit-switched networks, such as the Bell System, generally feature one link out per-device. In the use of a dedicated link, users have to pay for it on a monthly basis no matter how little the line is used, he said.

In the case of a switched link, as much time may be consumed estab-

lishing the link and processing as would normally be used for communications, he declared. "You're really paying for a good deal of idle time on the line," Collins claimed.

Packet-switching users are billed in accordance with the amount of data transmitted over the network and, in the U.S., they are not charged according to the distance between the sending and receiving points. "Consequently, packet-switched networks can be quite cost-effective in certain situations where you can't concentrate," the senior product manager pointed out.

On the other hand, a circuit-switched network would have the

upper hand in a situation where there is a heavy concentration of data using a maximum amount of band-

CW at CUE

width and being transmitted continually. Systems Network Architecture and remote batch users also get "very limited support" from packet-switched networks, according to Collins.

Public telephone networks are very effective where end users are widely dispersed, Collins said. For instance, a public network would be advanta-

geous if a company had several data centers with a high concentration of terminals and it wished to tie the data centers together.

The time-sharing-type features of packet-switched networks give them the edge in a situation where there is a need to link up individual, or less concentrated, computer sites, he said. Then the cost of connecting disparate points can be borne by several, not just a few, users.

When a connection between two points is established on the public telephone networks, the path between the sending and receiving points "doesn't really vary," Collins noted.

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MSRA Seminar Set for Oct. 13

NEW YORK — The Eighth Martin Simpson Technology Seminar will be held at the Park Lane Hotel here Oct. 13-14.

The two-day seminar is sponsored by MSRA, Inc. and will feature seven to eight sessions daily presented by both industry analysts and executives speaking on a variety of topics.

Some topics to be covered include an outlook for Japanese computer and communications companies, advantages and limitations of 32-bit architecture and the outlook for local networks vs. public networks.

Speakers include Martin Simpson, president of MSRA; James W. Perry, Data General Corp.; Laszlo L. Rakoczi, group vice-president of computer technology for Tymshare, Inc. and Charles A. Dickinson, president of Dataproducts Corp.

The fee for the conference is \$585. Information may be obtained by contacting MSRA at Room 200, 115 Broadway, New York, N.Y. 10006.

Expert Gives Strong Advice to Halt DP Abuse

By Brad Schultz

CW New York Bureau

NEW YORK — To curtail computer abuse, managers should give their definition of abuse to computing personnel in no uncertain terms, a security expert advised here recently.

Then managers should regularly audit systems transactions and job executions and monitor who gets what computing equipment in their organization, the expert explained.

An abrupt plunge in morale among DP personnel may indicate that computer abuse is under way or being covered

up, he told the Association of Systems Managers (ASM) New York chapter meeting.

When evidence of abuse is gathered, the expert stated, top management should always be notified.

In gathering evidence, investigators should strive to protect innocent people from unwarranted notoriety.

CSSU Director

The ASM chapter heard this advice from Rolf Moulton, who directs the Computer Security Services Unit (CSSU) in New York City's Department of Investigation. Moulton disclaimed resem-

blance to the fictional character who holds his job in *Applecrunch*, a new computer crime novel.

No other American city has a unit quite like CSSU, New York's top computer law enforcer declared.

As CSSU director, Moulton routinely investigates cases termed "theft of services," which are misdemeanors under New York law.

Theft of services would be the charge against someone who, without authorization, applied his employer's computing resources for "substantial" personal gain, Moulton explained. In prac-

tice, a culprit usually quits his job or is fired after CSSU pins him to such a "theft" with evidence.

District attorneys in New York and elsewhere seldom bring computer abuse cases to court, Moulton observed. This reflects the prosecutors' unfamiliarity with computer technology, he suggested, and unwillingness to report abuse on the part of victimized organizations. Computer abuse prosecutions rarely result in jail sentences for convicted abusers.

Some Abuse

On the other hand, a DP department morale problem occasionally leads to computer abuse, Moulton told the New York systems managers. Malcontent programmers sometimes vent rage by sabotaging a system or using a system to commit fraud, he noted.

Alert managers can therefore nip potential abuse in the bud by carefully checking out reasons for any perceived morale problem and dealing with those reasons, Moulton indicated.

They might also check out

the company parking lot. According to the CSSU director, computer criminals — those who do not take the money and run — are known to drive flashy cars that seem too expensive for people at their salary levels.

An employee's living beyond his apparent means is only a clue, Moulton emphasized, which might be considered with other clues.

The president of ASM's New York chapter, Raymond L. Michael, asked Moulton whether innocent people are often hurt by investigations of computer abuse. Michael is chief of planning and systems for the Kings County District Attorney's Office in Brooklyn, N.Y.

Moulton replied that innocent people often resign in the course of a vigorous investigation, weary of the trauma experienced when they are themselves subjected to tough interrogation or asked to give evidence that may implicate coworkers. That is one reason why managers should stress prevention of computer abuse over prosecution after the harm has been discovered.

Commerce Bars ADT From Trade With U.S.

Special to CW

WASHINGTON, D.C. — ADT Analog und Digital Technik (ADT) of Niedersachsen of West Germany, a company that had been identified as an alleged front for Werner J. Bruchhausen in criminal indictments in a Los Angeles court, has been barred from any trade with U.S. companies until further notice, the Department of Commerce announced recently.

Trade with Bruchhausen,

who has been implicated in technology smuggling to the USSR, has been barred since March 24 [CW, Aug. 31].

ADT was also alleged by California law enforcement officials to have attempted purchase of stolen micro-computer chips from Quest Electronics of Santa Clara, Calif., for resale on the European market. Quest's president, Roger Pitkin, has pleaded no contest to charges of trading in stolen chips [CW, Sept. 7].

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'Complete Security Does Not Exist'

IBMer Puts Responsibility for Security on User

By Lois Paul

CW Staff

FRAMINGHAM, Mass. — "Complete security does not exist and one of the principal people who forget that sometimes is the IBM Corp."

That statement was not made by a disgruntled user or by an IBM competitor. It was made by an IBM systems security consultant.

IBM's view is that the major responsibility for DP system security rests with the users and the vendor should help them achieve an adequate level of protection, according to Joel Urman. He was addressing about 250 attendees at a session entitled "Staying in Charge" at a conference sponsored by MIS Associates here last week on the control and audit of IBM systems.

Security violations generally occur not because hardware has been penetrated, but because procedures were not followed, Urman said. Security requires a balanced approach that considers the physical, administrative and the procedural as well as hardware and software, he continued.

Management Control

Security is focused on management control, asset protection and legislation compliance. "Having good security is part and parcel of having good management control and good management in general."

It is necessary for a user to determine what it is protecting its assets against, Urman said. When it comes to monetary loss, more than half of the incidents described in informal IBM customer surveys involved errors and omissions rather than dishonest or disgruntled employees or other factors.

Most security violations that occur involve authorized people doing authorized things. This indicates a need to limit user access to data to areas in which users specifically are involved and in which they can do the least amount of damage, he added.

When security violations occur, the perception in the

country is that it is better for a company not to go after the offenders. This is not the case with IBM, which will prosecute and fire anyone who violates a policy in the area of security, according to Urman.

"We fired someone recently over \$10," he added, stressing the need to be tough and "play policeman" at times to

make controls viable.

There are computer crime laws in 12 states. Urman gave as an example of the zealotry of this legislative phenomenon a law that lasted one day in Oregon and that made it illegal to possess information of a personal nature against someone not in your employ.

He stressed the importance

of establishing physical controls, an authorization mechanism and an enforcement discipline that includes prosecution.

Among key control problems Urman defined is a lack of understanding of this area on the part of management. Upper management is concerned about security, but does not understand enough

about the DP function to translate this concern into action on that level.

Systems are truly complex and becoming more so, Urman said, and this presents additional control problems. Higher levels of skills are necessary and different disciplines must be brought in, which creates communications difficulties.

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Vendors, ACU to Meet

Powwow Set on CPU Performance Standards

By Tim Scannell
CW Staff

BOULDER, Colo. — At least 15 computer vendors will meet here next month with the Association of Computer Users (ACU) to try to come up with standards for measuring the performance of large computers.

The two-day meeting scheduled for Oct. 12-13 will involve representatives from most of the major computer manufacturers, including Digital Equipment Corp. and Honeywell, Inc. One vendor that will be notably absent from the standards conference is IBM. To date, the company has not replied to the ACU's repeat-

ed written invitations to attend, said Hillel Segal, president of the 4,000-member nonprofit organization.

Review, Evaluation

The purpose of the conference is to review and evaluate the methodologies currently used to evaluate the performance of mainframe computer systems. By discussing and comparing the testing methods used by each vendor to ascertain computer performance and by asking vendors to define testing work loads, the ACU hopes to come up with a single or a group of testing standards that could be used across the board.

The ACU got the ball rolling in

May of this year when it held a three-day meeting on computer testing standards. In addition, an ACU research team headed by Prof. Carl Hamacher of the University of Toronto is currently completing work on specifications for the new series of tests. These specifications, to be designated ACU Series 4, will be presented at next month's conference, when the vendors will be asked to comment on their validity.

The specifications for previous ACU benchmarking efforts, which appeared in *Computerworld* and are code-named Series 1 through Series 3, were conducted by a group headed by Prof. Robert Taylor of the Univer-

sity of Colorado's Business Research Division.

While it is fairly simple to evaluate smaller systems with eight or fewer simultaneous users, Segal said there is no standard way to measure accurately a mainframe computer's performance. De facto measures, such as millions of instructions per second and Whetstone benchmarks, usually portray the computer system in its best operations light and not in a "real-world" situation. On the other hand, the standards the ACU hopes to develop will be real-life application loads that will be tailor-made for specific operating environments, Segal said.

"If properly done, these standards would give us a rating of how each machine performs with a certain applications load," he continued. "Up to this point, there were simply no such numbers and vendors admittedly picked numbers out of the air for performance charts."

Although IBM's absence from the standards meeting will make it difficult to prepare a well-rounded system of evaluation, the ACU intends to continue with its efforts until some specifications are established.

"We're determined to do it with or without their participation. If they don't participate, we'll do the evaluations on their equipment without them," he said. Over the years, ACU has evaluated a variety of systems ranging from small business-oriented microcomputers costing a few thousand dollars to advanced mini-computers in the \$15,000 to \$50,000 price bracket.

Bolger Defends Zip Code Notices

CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service's (USPS) notification to 15 million customers of its nine-digit Zip Codes last month, conducted at an estimated cost of \$1 million, did not violate a recently passed law postponing implementation of the "Zip+Four" program until 1983, Postmaster General William F. Bolger told a House of Representatives subcommittee recently.

Under the new law, USPS is allowed to release information on the new Zips, Bolger noted, saying the action was "fully consistent with the intent of the law."

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This week, "Computerworld's" cameras take you to Santa Barbara, where young kids go to camp, not to swim or ride, but to program computers. Then it's off to Detroit, where computerized mannequins are adding a new chapter to the Motown sound. And Len Lawrence adds a special report on a nationwide chain of bars that uses computers to dispense mixed drinks and prevent inventory "leakage."

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Adapso Head Advocates Packages

By Lois Paul
CW Staff

CHICAGO — "I am here as an advocate of packaged software solutions, which make sense in today's environment," Robert E. Weissman, chairman of the board of the Association of Data Processing Service Organizations, Inc. (Adapso), declared at the recent Software Info here. Weissman, who is also executive vice-president of Dun and Bradstreet, advised DP managers to examine software packages carefully, not as competition to in-house development, but as a tremendous tool to free programming resources and essentially to improve response time to meet user needs.

"With more than 6,000 packaged software products for mainframes and mini-computers ... most needs can be satisfactorily met with available offerings," he contended. "They can improve productivity and the way you run your business."

The U.S. is moving from a hard goods to a base service society; in 1981, 54% to 61% of the GNP was service-derived, according to Weissman. "Software is the embodiment of function in any information system. It is the intelligence that must be critical before any system has

any utility."

Although the hardware system cost experience curve will continue to drop at a 20% to 30% rate, software cost per line of clean code is rising, he said.

In 1980, there were three programmers for each machine, Weissman said and predicted that by 1985 there would be 0.3 programmers for each machine.

Software Shortage

"Today there is a real and growing software shortage and it is not for lack of trying," he said. Ironically, the proliferation of software packages is intensifying the software shortage because it increases the need for maintenance. Weissman cited recent IBM figures, which state that 80% of a programmer's time today is spent on this component.

The first 90% of program development takes 10% of the time and the last 10% takes the other 90%, Weissman said.

Comparing the cost of packaged vs. custom software, Weissman said the former costs \$1/instruction, on the average, and the latter runs \$8/instruction.

Maintenance costs generally are 10% to 15% of the original purchase price, he said, compared with an 80% annu-

al reinvestment rate for custom software.

He pointed to the simplicity of package installation, which generally yields software that can be implemented within hours or sometimes days, as opposed to in-house packages that may take weeks or months.

"In the task of providing

useful information, I believe packages provide a clear advantage," Weissman said. Purchasing packaged software pools the research and development effort that promotes standards and common technology, according to Weissman, and will eventually benefit vendors and users.



Robert E. Weissman

Consultant Sees Packages As Competitive Bank Tools

By Lois Paul
CW Staff

CHICAGO — Software packages can go beyond standard applications to become competitive tools for banks.

In a recent Software Info session entitled "Future Trends in Package Utilization," Elaine Davis, a senior DP consultant with Dell Publishing, described the opportunities for the use of software with various customer bases.

Davis suggested the biggest need in the corporate/wholesale area is for devising a direct link to corporate customers, on-line, for funds movement and account inquiries.

Banker-to-banker services can include funds transfer, automated teller machines and network interfaces, Davis said. With smaller corporate customers, banks will emphasize cash management, financial planning and account inquiry.

"Teleshopping" is an opportunity Davis foresees in the "natural partnership" of banks and retail stores. Problems arise in this area regarding questions of who will

take the first step, who will benefit most and how costs will be shared, she said.

Teleshopping, which Davis noted is a reality in Europe and Canada, offers the bank a direct role as an advertiser for its own services and an indirect role as the payment mechanism for consumers.

Other Trends

Another trend Davis described is jointly developed software packages, funded by banks and organized and executed by software firms. This enables banks to define their needs before the package is created and to share expenses and expertise during the development period.

Problems inherent in this concept are that these packages take longer to develop, the banks lose some control over the process and compromise regarding requirements is inevitable, according to Davis.

Other trends Davis predicted are the need for increased data security, which she said is more important in this industry than in any other; the increased use of packages; and turnkey products in smaller banks.

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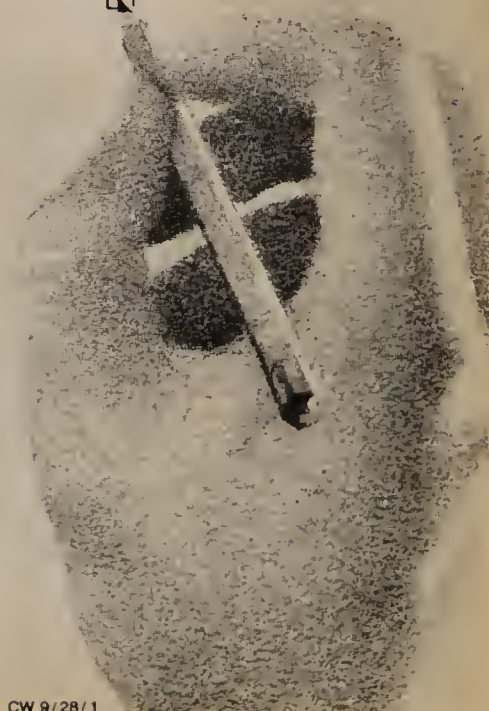
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Fran Tarkenton Advises Software Meet on Hiking Productivity Off the Field

By Rita Shoor
CW Staff

CHICAGO — What would an ex-pro football player and television personality be able to tell a group of case-hardened DP managers about "motivating professionals for greater productivity"?

Judging from the full house present during the keynote speech delivered by Fran Tarkenton at the recent Software Info conference here, the information systems specialists were ready and willing to listen to anything the former Viking quarterback had to say.

After an introduction by John Imlay, chairman of the board of Management Sciences America, Inc., Tarkenton began by noting that he had flown in after a session with Howard Cosell during the Monday night football game. "Cosell on Monday night and Imlay on Tuesday morning — Cosell was a lot easier," he quipped, delighting an audience that was at least 90% male.

Appealing to a group that was obviously in the mood to enjoy football stories as a relief from three-hour seminars on various types of software packages, Tarkenton spun nostalgic reminiscences from a football career spanning about 18 years.

But the "old quarterback" is also president of Tarkenton and Co., a \$3 million business employing approximately 70 consultants that specialize in helping large firms to increase productivity, and he had some practical advice to offer managers.

Begin by becoming involved with personnel at all organizational levels, he counseled. "Go down to the bowels of the company and find out what the workers think." The second requirement for increased productivity means having some sort of score-

keeping system. "There must be a baseline from which you begin to measure productivity so that you have some idea of where you want to go." Measuring performance or "keeping score" is the fun of working, according to Tarkenton.

Last, and perhaps most important, the successful manager must have some sort of feedback mechanism. How often have you had a good thought about someone's work and neglected to tell that person about it? "People only perform well if they get reinforcement," he maintained.



Fran Tarkenton

CW Photo by L. Paul

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For Overburdened Mainframe Users

Panel: Micros Can Unlock Programming Logjam

By Rita Shoor
CW Staff

CHICAGO — Everyone agrees there is a severe programming bottleneck in traditional, mainframe-oriented DP shops. So where will overburdened information systems directors turn for help?

To microcomputers and software packages, according to a round table discussion conducted by four industry experts during the recent Software Info conference here.

Session chairman Jerome L. Dreyer, president of the Association of Data Processing Service Organizations, Inc. (Adapso), began by asking how much impact the much-discussed mi-

cro explosion would have on mainframe users in large organizations.

Panel members were unanimous in agreeing that personal computers would significantly affect these users and that organizational changes are taking place right now. Some large companies are, in fact, already utilizing micros for distributed processing, according to Elizabeth Severino, a vice-president with Symcro Systems, Inc.

One reason for ready acceptance of the personal computers is that they allow department managers to avoid centralized control of internal DP-related activities. Another is their low cost. "If you buy micros via the com-

ponent path, you can easily bury them in your expenditures," Severino, formerly editorial and technology vice-president of Datapro Research Corp., noted.

Micro users are attacking their two-year applications development backlogs because it is "fast and cheap to do it on a micro," she said. But there are several problems. One is the limit on file storage size; 1M-byte seems to be the maximum storage currently available. Another problem crops up because the 8- and 16-bit micros cannot handle advanced scientific calculations. Finally, and perhaps most important in a corporate environment, almost all micros can success-

fully send information to a mainframe, but "very few can get it back," she said.

However, those limits won't keep department heads from utilizing the personal computers. The micro impact in large companies will be from the bottom up, said Bruce Cross, president of Bruce Cross Associates, a marketing and consulting firm.

Users will begin by making the computers work at a personal level. But at some point "mainframes and micros will mesh somehow to provide these users with access to business information," he predicted.

Cross was also convinced packaged software for the vertical applications market is coming in a big way. "Computer end users can demand to see the product performing their required functions before they buy it," he maintained, predicting that each of the vertical markets would wind up being served by literally "hundreds of vendors."

Micros and applications packages will help. But do not expect them to dissolve the programming productivity bottleneck totally.

Rising Expectations

Rand Information Systems, Inc. has been measuring programmer productivity for the last seven years and continues to be "somewhat disappointed," according to Ethan Bortman, director of the firm's Midwest operations. The problem is that expectations keep rising because of better hardware and programmer tools, he said. There may be some gains in absolute programmer productivity over the next 10 years, "but relative to hardware gains, we're going to continue to be disappointed."

"The productivity bottleneck will continue to exist as long as applications systems are developed by people," James Borendame, a manager from International Harvester Co., agreed.

On the positive side, DP managers are beginning to realize productivity is actually a tool to improve both the quality and quantity of computer programs and systems, Borendame continued. International Harvester is trying to focus on developing a "pride in product" attitude among its programmers and analysts, he said. "Every time we can do that, we see higher productivity and better quality."

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Hardware Planners Told to Try Software Model

By Jeffrey Beeler

CW West Coast Bureau
LAS VEGAS — Hardware planning and implementation requires a formal methodology similar to those already used for creating new software, according to the DP supervisor for a New York City area utility.

The adoption of such a methodology would streamline most hardware conversions and minimize their ac-

companied risks, Gregory Beary said recently at the fifth annual Data Entry Management Association conference.

Beary, who works for the Orange and Rockland Utilities Co., urged hardware planners and implementors to heed the example of many insurance companies, which for years have used a standardized procedure for developing their in-house soft-

ware.

Known as the "software development methodology" or "software development life cycle," the procedure is based on several well-tested principles and techniques that have reportedly helped to improve project management and cut systems implementation costs.

An effective methodology for equipment conversion or implementation should con-

sist of five main steps, the DP supervisor explained. These steps include the identification of a user problem, a preliminary study of the available hardware options, an analysis of systems requirements, the installation itself and a postimplementation review.

In the first step, problem identification, the key objective is to ensure that a new piece of equipment is being

installed for the right reasons. Too many hardware purchases are prompted merely by the desire for status or by the impulse that "we just have to have this new product," Beary said.

Chances are good that the reconfiguration of a system is unnecessary unless the effort will result in improved computing department productivity.

After a user problem has been defined, the next step in the five-phase installation methodology is to conduct a preliminary study, which primarily entails a comparison of competing vendors and the technological capabilities of their respective product lines, according to Beary.

Beary described vendor and product comparisons as the "key" to success in any effort to install new hardware.

If the findings from a preliminary study indicate the need for new hardware, a computing department should then conduct a requirements analysis.

Hardware Installation

The next stage in the implementation methodology begins with the hardware installation itself. At this point, the activities of all the participating vendors have to be closely monitored and coordinated.

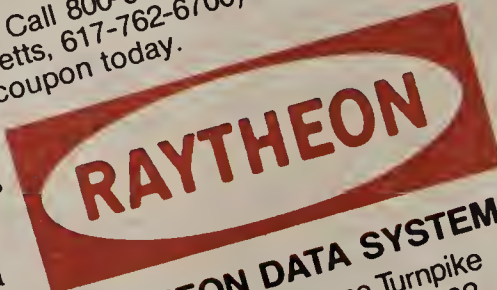
Another key goal of the installation phase is to ensure that all existing hardware remains in place until the replacement gear has fully proven it can work.

After a hardware installation is complete, the methodology enters its final stage — the postimplementation review, which is intended primarily to gauge the extent to which the problems identified in the initial stage have been solved.

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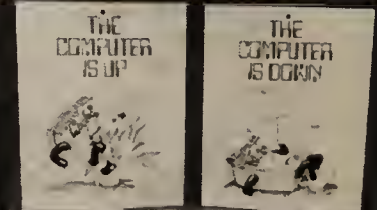
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With 'Participative Management'

Getty Cuts Data Entry Turnaround by 95%

By Jeffrey Beeler

CW West Coast Bureau

LAS VEGAS — A major U.S. oil company has reportedly used a "participative management" style to dramatically speed the completion of one of the firm's most onerous data entry tasks.

Since the management style's adoption, Getty Oil Co. has sliced the unpopular job's turnaround time from 40 man-hours monthly to two man-hours monthly, according to the firm's data entry supervisor, Joe Canas. Further improvements in the data entry department's operations will eventually cut the turnaround time to half a man-hour each month, Canas said at the recent fifth annual Data Entry Management Association conference.

Alternative Approach

The increase in the department's data entry efficiency is said to be primarily attributable to Canas' recent experiments with the alternative management approach, which was first used extensively in Japan and is now beginning to gain widespread acceptance in the U.S., he said.

The approach is based on the theory that productivity and work quality can be dramatically increased when employees are given an expanded role in corporate decision making and in solving their own job-related problems, Canas said.

The object of Canas' participative management experiment was to streamline and simplify one of his department's most bitterly despised data entry chores.

Canas' own role in the project was limited primarily to giving his 28-member staff a preliminary crash course in formatting, programming and other basic systems development skills, he explained.

After the training period ended, the project was turned over entirely to the employees, who were given free reign to make their own management decisions and find their own systems solutions.

Workers' Targets

The target of the workers' job improvement effort was an extremely tedious task involving "updates of Getty Oil's" journal vouchers, which are used to keep track of all the financial and production data for each of the company's oil well leases. Because the firm controls thousands of such leases, it also maintains thousands of journal vouchers, which re-

quire monthly updating to reflect continuing changes in oil well activity, Canas explained.

A typical Getty Oil journal voucher is composed overwhelmingly of data that remains relatively constant from month to month.

Only about 20% of an average voucher's overall content could be aptly described as fast changing, according to Canas.

Clearly the most efficient way of updating such a document would be to keep the vast bulk of its content intact

and revise only those selected portions where frequent changes are necessary.

At Getty, however, the data entry department was forced to adopt just the opposite approach, primarily because of an idiosyncrasy in the design of the company's system, he noted.

Every time a voucher had to be updated, the employees were required to reenter the document from scratch, even though the revisions usually accounted for only a tiny fraction of the total content, Canas recalled.

The result was that the workers were constantly having to key in data that had already been entered many times before, he explained.

Updating Facility

To eliminate this maddening repetition, the data entry staff members recently developed their own field updating facility, which allows an existing voucher to be revised without requiring the rest of the document to be reentered.

Before the editing facility

went into operation, a typical voucher update required the input of seven new documents.

Today, the same job demands just one new record consisting of eight fields and, in the near future, the document size is expected to be further trimmed to three fields, Canas said.

Most of the department's success in cutting its voucher-updating work load resulted from the early decision to allow the operators to devise their own solutions, according to Canas.



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Another Career Pathing Question

Q Can you provide any guidance on career plans for people employed as DP policies and procedures analysts? Some friends who are technical writers are working in these fields and would like to become more informed about their work potential.

A Policies and procedures analysts range from being technical writers who copyedit management information systems (MIS) manuals to people who work directly with top management in establishing and documenting MIS policy. People holding positions with such titles are usually in transit to and/or from a more traditional MIS function.

Experience in the more traditional areas is paramount to being successful as a policy and procedures analyst. For this reason, I see the career path of the successful policies and procedures analyst overlapping with these functions.

For example, a technical writer with no systems or analytical background has limited upward mobility. A career path wholly within the policies and procedures area may be five to eight years away.

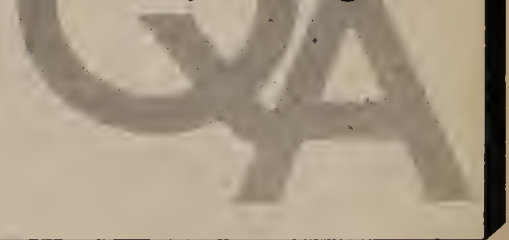
In the search for increased productivity, thousands of MIS managers have simply overlooked the implementation of MIS policies and procedures as a strategy. I've seen multinational corporations with no written policies or procedures. Certainly, the

work potential for such analysts is there, but recognition of the need is not.

Q I feel your response to the woman whose husband consistently worked "offbeat" hours was not entirely accurate.

Having been in this business for more than 10 years, I have spent more than my share of long hours in a computer room (including all night and weekends). This is a "peak-and-valley" type of career field. It is not uncommon to put in long hours for certain periods of time; at other times, the routine matters of programming might well be termed boring.

Turnaround Time By Larry E. Long



The letter indicated that "Ralph" is a programming manager. Ralph needs to delegate authority more effectively or hire more competent programmers so he does not have to be on the scene constantly. If Ralph is not supervising and his own systems and/or programs require that much personal attention, perhaps his boss will soon see what his wife has already seen — and Ralph may be searching for a new position.

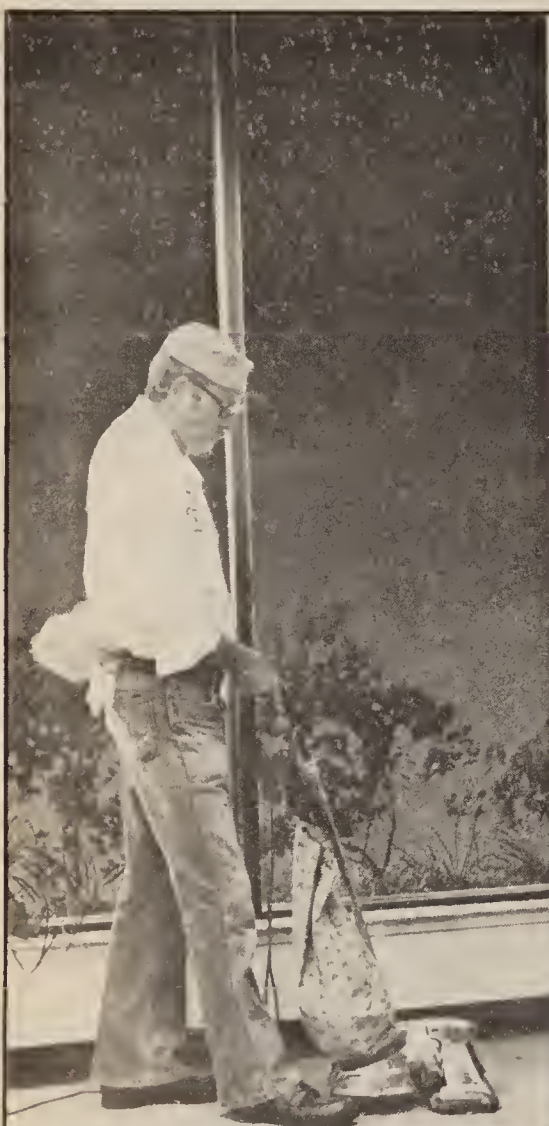
A You've addressed another facet of the problem that was not covered in my initial response. Thanks for the input.

Q I can sympathize with the person who had a boss who doesn't make work assignments or even inquire about work being done by people under his control. We have one in our shop, too. Doesn't everybody? In answer to your question about what he does, I can only relate what our boss does. He reads *Computerworld* a lot.

A I recognize it's no solace, but my mail indicates that someone must be cloning nonmanaging DP managers.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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Deemed Illegal by State

New York Folds Computerized Gambling Plans

By Bob Johnson

CW New York Bureau

NEW YORK — Plans for computerized poker and blackjack video games, predicted to be the New York State Lottery Commission's newest money maker, were scrapped by the commission's director here recently.

Massachusetts, which had been contemplating a similar scheme, also scrapped its computerized gambling plan recently.

In a 19-page report sent to Lottery Commission Director John D. Quinn, State Attorney General Robert Abrams deemed the computer terminals that were to be used for the games illegal because they violated the state constitution and lottery laws that prohibit casino gambling.

"If blackjack and poker can be played with a computer instead of a croupier, then roulette, craps and other mainstays of Las Vegas and At-

lantic City gambling can be similarly transformed," the report stated. "The versatility of the computer is such that each computer terminal could itself become a minicasino."

Experimental Project

The Lottery's plan called for 20 machines to be installed around the state under an experimental project. Seventeen of them would have been in the New York City area and the remaining three in Albany. If the experiment proved to be a success, lottery officials would have placed 300 terminals across the state in bars, hotels, transportation terminals and off-track betting parlors.

The machines, manufactured by SD Systems, Inc., a subsidiary of the Dallas-based Syntech Corp., are touch-sensitive Model UTT 200 and VTT 100 terminals. They were to be hooked up on-line to an SD Systems Marathon CPU, which would have allowed bettors to wage minimum bets of 50 cents on blackjack and poker with a maximum return of \$3 on blackjack and \$200 on poker. The administration and operation of the terminals was the responsibility of Multi-Games Ventures, Inc., another Syntech subsidiary based in Westchester, N.Y.

According to Syntech President and Chairman of the Board Gordon

Graves, the company is looking into the possibility of bringing suit against New York state to recover investment losses suffered from the cancellation of the project. However, he said he hoped the problem could be settled without legal action.

Abrams' argument was based on the fact that gambling against an electronic "house" did not involve the selection of a winner by chance from a pool of participants as the state legislature intended.

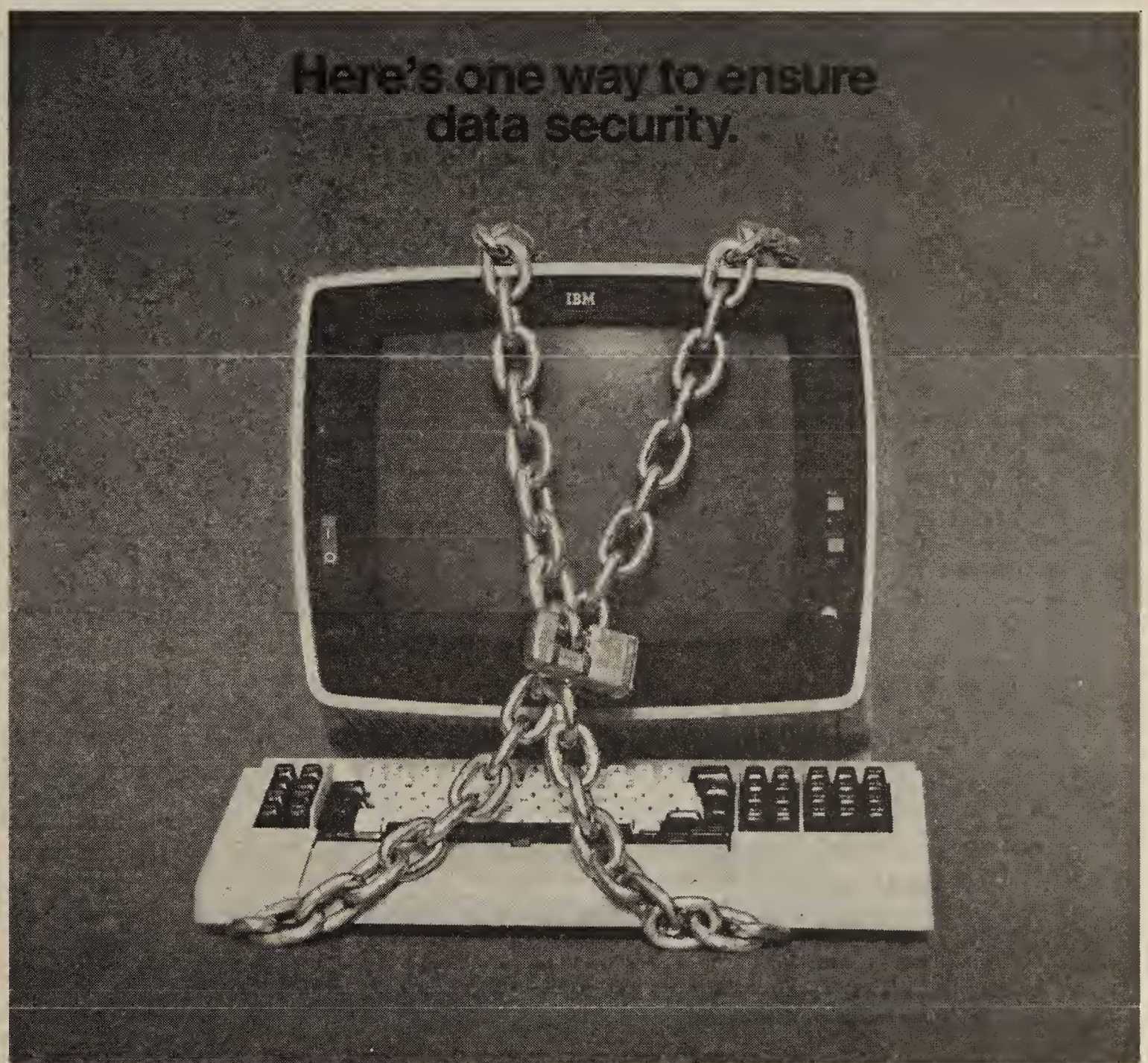
However, he did state that the only way the games could be legalized was if the Legislature passed a constitutional amendment sanctioning them.

Meet to Examine U.S. Data Files

ALEXANDRIA, Va. — A workshop on the use of U.S. Census Bureau and other statistical data files will be held here Sept. 30 to Oct. 1.

"The Census Data File Workshop," sponsored by Warren Glimpse & Co., was designed to provide guidance and instruction to those planning to use census and related statistical data files. Topics will include computer hardware and software considerations, file organization and structure, use of technical documentation and dictionary files, preparation of file extracts and file integration and address matching.

The fee for the two-day workshop is \$190. Further information is available from Warren Glimpse & Co., 115C South St., Alexandria, Va. 22314.



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Which jobs use my files?

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Shows which programs update or change DATABASES.

Shows which programs, PSBS and DATABASES reference segments and FIELDS (and vice versa).

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Calendar

Oct. 22-23, Atlanta — **Local Network Equipment Seminar.** Contact: World Network Equipment Seminar, Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

Oct. 23, Dallas — **TX-Third Annual Southwest DP Auditing Conference.** Contact: Joanne Paulman, PDI, P.O. Box 13288, NT Station, Denton, Texas 76203.

Oct. 25-28, San Francisco — **Issue '81, the Fifth Annual SPSS Users and Coordinators Conference.** Contact: Steve Hamburg, Issue, Inc., P.O. Box 8224, Chicago, Ill. 60680.

Oct. 25-30, Washington, D.C. — **The Information Community: An Alliance for Progress.** Contact: Asis, 1010 16th St. N.W., Washington, D.C. 20036.

Oct. 26-27, Williamsburg, Va. — **Creating a High-Performance Training Unit.** Contact: George Washington University, Division of Continuing Education, Professional Development/Tidewater Center, 2019 Cunningham Drive, Hampton, Va. 23666.

Oct. 26-27, Houston — **Developing and Implementing Purchase Order Management Systems.** Contact: Sylvia Vogelman, Center for Retailing Management, 425 Park Ave., New York, N.Y. 10022.

Oct. 26-27, San Francisco — **How to Manage Data and Information as a Resource.** Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 26-27, New York — **Computers in Food Service Management.** Contact: Sylvia Vogelman, Center for Retailing Management, 425 Park Ave., New York, N.Y. 10022.

Oct. 26-28, New York — **Fifth Annual Conference on Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 26-28, Washington, D.C. — **Capacity Planning Seminar.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 26-28, Atlanta — **Improving Automated Payroll Systems.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Oct. 26-29, Washington, D.C. — **IMS/VS Application Development Facility.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Oct. 26-29, Washington, D.C. — **Strategic Planning.** Contact: Performance Development Corp., 1101 State Road, Building N., Princeton, N.J. 08540.

Oct. 26-30, Chicago — **DMS/CICS/**

VS Application Design and Coding. Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Oct. 26-30, Boston — **Advanced Structured Analysis and Data Base Modeling & Design Workshop.** Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 26-30, San Francisco — **Structured Design.** Contact: Boeing Computer Services Co., Suite 2001, 425 California St., San Francisco, Calif. 94104.

Oct. 26-30, Washington, D.C. — **Data Communication Systems and Networks and Digital Image Processing of Earth Observation Sensor Data.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 26-30, Los Angeles — **Structured Design and Structured Programming Workshop.** Contact: Dr. Ned Chapin, Infosci, Inc., Box 7117, Menlo Park, Calif. 94025.

Oct. 27-28, Atlanta — **Understanding Modern PBX Systems.** Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Oct. 27-29, Jacksonville, Fla. — **Annual Jacksonville Data Processing Managers' Association Exposition: The Frontier of Technology.** Contact: Darrell Hedberg, P.O. Box 272, Jacksonville, Fla. 32201.

Oct. 27-30, New York — **Project Management.** Contact: Boeing Computer Services Co., 560 Lexington Ave., New York, N.Y. 10022.

Oct. 28-30, New York — **Effective Writing Workshop.** Contact: Boeing Computer Services Co., 560 Lexington Ave., New York, N.Y. 10022.

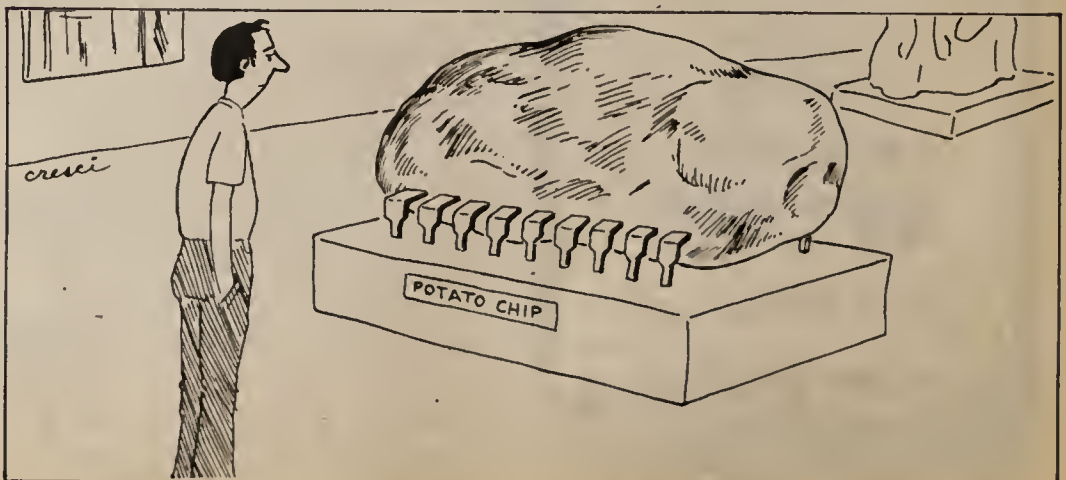
Oct. 26-28, Arlington, Texas — **On-Line Systems Design.** Contact: Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Oct. 26-30, Wellesley, Mass. — **Systems Analysis Workshop.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Oct. 27-30, Ft. Worth, Texas — **CAM-I Graphics Expo.** Contact: Computer Aided Manufacturing International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

Oct. 28-30, San Francisco — **How to Build and Use an Information Resource Directory.** Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 29-30, Chicago — **BBN Information Management.** Contact: BBN Information Management Corp., 68 Moulton St., Cambridge, Mass. 02238.



Performance Evaluation Set As Topic of Oct. 12 Seminar

PALO ALTO, Calif. — Performance evaluation is the topic of an upcoming three-day seminar sponsored by the Technology Transfer Institute to be held here Oct. 12-14.

The purpose of the seminar is to develop intuition about computer performance problems and to show how to calculate the performance mea-

asures of common interest.

Peter Denning, the originator of the "Working Set Concept" and president of the Association for Computing Machinery, will lead the seminar. Denning teaches from his three basic premises: the quantities of interest are directly measurable, work flow is balanced and the operation of any given device depends only on the jobs present in its own work queue.

The seminar fee is \$695, which includes all materials, coffee breaks and lunches. Further details are available from Technology Transfer Institute at 741 10th St., Santa Monica, Calif. 90402.

Boston ACM Group To Hold Seminars

WELLESLEY, Mass. — The Greater Boston Chapter of the Association for Computing Machinery (ACM) has planned two professional development seminars.

On Oct. 17, Jeffrey Buzen, vice-president of BGS Systems, Inc., will conduct a one-day seminar entitled "New Directions in Modeling and Simulation." Stuart Wecker, president of Technology Concepts, Inc., will offer a seminar on "Local-Area Computer Networks" on Nov. 7. The seminars will be held at Framingham State College. The fee is \$50 for chapter members and \$55 for nonmembers. ACM can be reached at 7 Pilgrim Circle, Wellesley, Mass. 02181.

Cpeug to Hold Annual Meeting Nov. 17-19 in San Antonio

WASHINGTON, D.C. — The Computer Performance Evaluation Users Group (Cpeug) will hold its annual meeting Nov. 16-19 in San Antonio, Texas.

The theme of the meeting is "Increasing Organizational Productivity." The conference program reportedly reflects the role of information services in the productivity and survival of organizations.

It also will cover such trends as increasing personnel costs, limited budgets and the convergence of DP, word processing and communications technologies.

The registration fee is \$85. There is an optional conference summary luncheon on Nov. 19 for an addition-

al \$10.

Further information is available from Theodore F. Gonter, U.S. General Accounting Office, Room 6011, 441 G St. N.W., Washington, D.C. 20548.

IEEE Directory Out

PISCATAWAY, N.J. — The Institute of Electrical and Electronics Engineers, Inc. (IEEE) Publishing Services Group has just released the *IEEE 1981 Membership Directory*.

The directory costs \$22 for IEEE members and \$50 for nonmembers.

It can be obtained from the IEEE Service Center, 445 Hoes Lane, Piscataway, N.J. 08854.



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Computer Graphics Utilized In Heart Disease Treatment

By Bob Johnson

CW New York Bureau

NEW YORK — Described as the cutting edge in the diagnosis of heart disease, a new medical technique utilizing computer graphics is being used by Dr. Derek Enlander, head of nuclear medicine at the New York University (NYU) Medical Center here.

Called Nuclear Scintigraphy, the process allows doctors to see graphic images of patient's organs on a CRT terminal screen as they are functioning in the patient's body.

Here is how it works: The patient is injected with a small amount of radio-pharmaceutical isotopes that

chemically attach themselves to the organ the doctor wants to view.

A specially designed gamma ray camera scans the area of the body and picks up the image from the radioactive particle.

The image is then sent to the mini-computer, frame by frame, where an analog/digital converter translates it into an image that can be viewed by doctors at the CRT terminal screen.

Accurate Display

Enlander said by regulating the speed of the frames viewed, the image gives a nearly accurate display of actual organ function.

He offered the image of a heart beating as an example, stating that by seeing the flow of blood in and out of any part of the heart doctors can determine if there are any blood deficiencies.

With special software developed with the help of Dr. Joseph Sanger and Dr. Daniel Benjamin, Enlander said the procedure has made the diagnosis of heart problems more precise.

One advantage of the computer system, the doctors said, is that the images can be stored on floppy disks and viewed any time they desire. With 30 to 40 patients needing work done on the systems each day, the convenience of the floppy is invaluable, they noted. A Winchester disk is also being ordered to supplement storage, they added.

Computer graphics is also being used at the center to assist work being done at Brookhaven National Laboratories, Enlander noted.

Pett X-Rays

X-rays from position emission transaxial tomography (Pett) scanners at the lab used to scan a patient's brain is sent to the NYU center where, with the help of a Varian graphics system, 3-D image slices of the brain's functions are reconstructed, Enlander said.

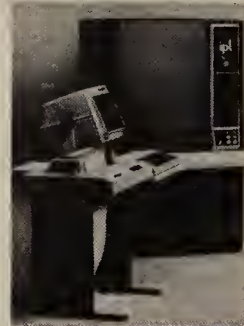
This method enables doctors to see brain functions as blood and chemical interaction, which previously could not be done.

No stranger to computers, Enlander has been working with them since 1967 at Stanford University and has written two books, *Computers in Laboratory Medicine* and the recently released *Computers in Medicine—An Introduction*.

His expertise has allowed him to construct hardware based on his department's Apple Computer, Inc. Apple II computer that can interface with the Nuclear Scintigraphy output.

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Martin: Cheaper, Faster Gear Not Always Best

By Rita Shoor
CW Staff

NEW YORK — Is cheaper and faster hardware necessarily a good thing? Not in and of itself, according to James Martin, software theorist and industry guru, who maintains that "the biggest problem in the computer industry is related to the fact that computers are getting too cheap and too powerful."

Predicting that the computer processing power available in 10 years would be approximately two orders of magnitude greater than it is today, the futurist noted it would be impossible to develop and educate enough programmers to utilize that power. The only other option is to significantly increase the productivity of

the programmers in the field, Martin expounded during a recent press conference here [CW, Sept. 21].

He placed an accent on "significant," pointing out that while techniques like structured programming and design are "excellent methodologies," the productivity increases realized from them can only be described as "slight."

"The computer industry is moving to an entirely different set of techniques, a set of fourth-generation methodologies," Martin said. These will be a "fairly broad collection of techniques with a focus on increasing productivity."

New languages will be incorporated among the fourth-generation techniques, the theorist continued.

Machine language, assembly languages and high-level procedural languages like Cobol and PL/I were the first three generations, he said. The fourth generation of languages will split into two classes, according to Martin.

One will include nonprocedural, user-friendly languages. The other will consist of procedural languages "in which we can achieve results at about 10 times the speed of Cobol." Ideal, a calculus-based relational language scheduled for release by Applied Data Research, Inc. during the first quarter of 1982, might serve as an example of this type of software.

A new type of network that "must be a corporate resource independent of the data supporting it" will also

appear, Martin said. Most data will be on-line within five years and working with these kinds of networks "implies a different kind of training for the system analysis process".

Education will be a problem since "people want to hang on to old techniques," he said. The result of these changes will be "five years of chaos with a wide diversity of different languages and methods." And that is the difficulty with which DP executives must deal in the near future, he concluded.

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Further information on the course can be obtained from Dr. Donald Rauch at Evolving Technology Seminars, Suite F, 3725 Talbot St., San Diego, Calif. 92106.

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Daring Attitude Required In DP Productivity: Martin

By Jack Rochester
CW Staff

DENVER — New fundamental technologies and an "adventurous attitude" are required if significant gains in DP productivity are to be made, according to author James Martin.

There must be a 1,000% increase in systems productivity in the next five years because computer hardware is getting too cheap and applications are being developed too slowly, Martin told 300 attendees at the 1981 annual conference of the Society for Management Information Systems (Smis) held here recently.

The average wait in Fortune 500 companies for a new application using conventional structured techniques and Cobol is three years, Martin said. Moreover, Martin indicated a 168% "invisible backlog" among those who abandon hope for their application without ever trying.

Fourth-Generation Languages

The only way to cope with this enormous problem, Martin told the assembled management information systems managers, is to begin using fourth-generation nonprocedural languages.

While many prespecified applications can and should be run with third-generation or structured techniques, many do lend themselves to "user-driven computing," Martin said. These include administrative procedures, shop floor control, information systems, decision support systems and the office of the future.

"The tools are here now and you should be using them," Martin said, adding that the conventional DP life cycle creates a wall between the user and the applications programmer and is far too cumbersome for today's needs.

Six-Step Program

He recommended a six-step program for user-driven computing:

- Flesh out a version quickly, just to see if it is what the user wants or needs; then begin modifying it.
- Try developing the application with a generator or with software, rather than with formal, written steps.
- Make it a self-documenting system, or have interactive documentation created with the applications.
- Let the users create their own applications, working with the systems analyst.
- Allow for continuous maintenance, as required or determined by the application.

A user-driven application has several advantages, Martin said. One, it takes only a few days — at the most several weeks — to implement, compared to the conventional DP life cycle. Two, it is far less expensive to create and to maintain, since it is written in nonprocedural languages. Martin pointed to the Santa Fe Railroad, where users developed and implemented their own application for work flow scheduling. Not only was the new system a success, but morale was vastly improved.

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EDITORIAL

Tantalizing Choices

High-performance 32-bit superminicomputers are nothing new in scientific circles. However, they are currently making a bold effort to penetrate the high-end 16-bit commercial DP segment — the so-called "bread and butter" portion of the computer market [CW, Sept. 21].

While the frenzy of low-end 32-bit systems introductions may initially throw a wrench into pending purchase decisions, they will ultimately offer tantalizing and relatively inexpensive new hardware choices for DP managers.

Since 1974, these multimegabyte systems have been busily crunching mountains of scientific data, juggling scores of transaction-oriented terminals and building a formidable reputation in the burgeoning computer-aided design and manufacturing field.

Not surprisingly, 32-bit machine vendors have recently discovered that what is good for the scientific goose might be even better for the traditional 16-bit business gander.

In the past few weeks, a number of 32-bit vendors — most notably Perkin-Elmer Corp. and Data General Corp. — have introduced machines that are not aimed at, as one industry executive half-jokingly called them, the multiapplication "lunatic fringe." On the contrary, these supercomputers — especially PE's compact Model 3210 — are targeted at those users who now have or are considering high-end 16-bit computers.

Not willing to be caught in anyone's product wake, a handful of other companies, including one that has its roots firmly implanted in 16-bit soil, have similar scaled-down 32-bit systems waiting in their corporate wings.

While the rules of the 32-bit game are the same — increased memory addressability, higher system throughput and easier program development — the game board has changed.

The cost-conscious user can now compare high-end 16-bit computer systems with 32-bit alternatives on performance, precision and other inherent values — not just on price.

DATA PAST

Five Years Ago Sept. 27, 1976

ATLANTA — Both then-President Gerald Ford and President-to-be Jimmy Carter relied on computer systems to reach large segments of the population in hopes of winning the November presidential election. Although both candidates utilized DP systems, they used the technology in different ways and for different purposes.

WASHINGTON, D.C. — The Federal Election Commission (FEC) unveiled a computer system to monitor federal campaign spending.

For the first time, this multivendor system will make available to the commission and the public summaries and analyses of the money flow in national politics before an election occurs, FEC Chairman Vernon W.

Thompson, said at that time.

"In the past," he noted, "this kind of data was developed only long after the elections were over."

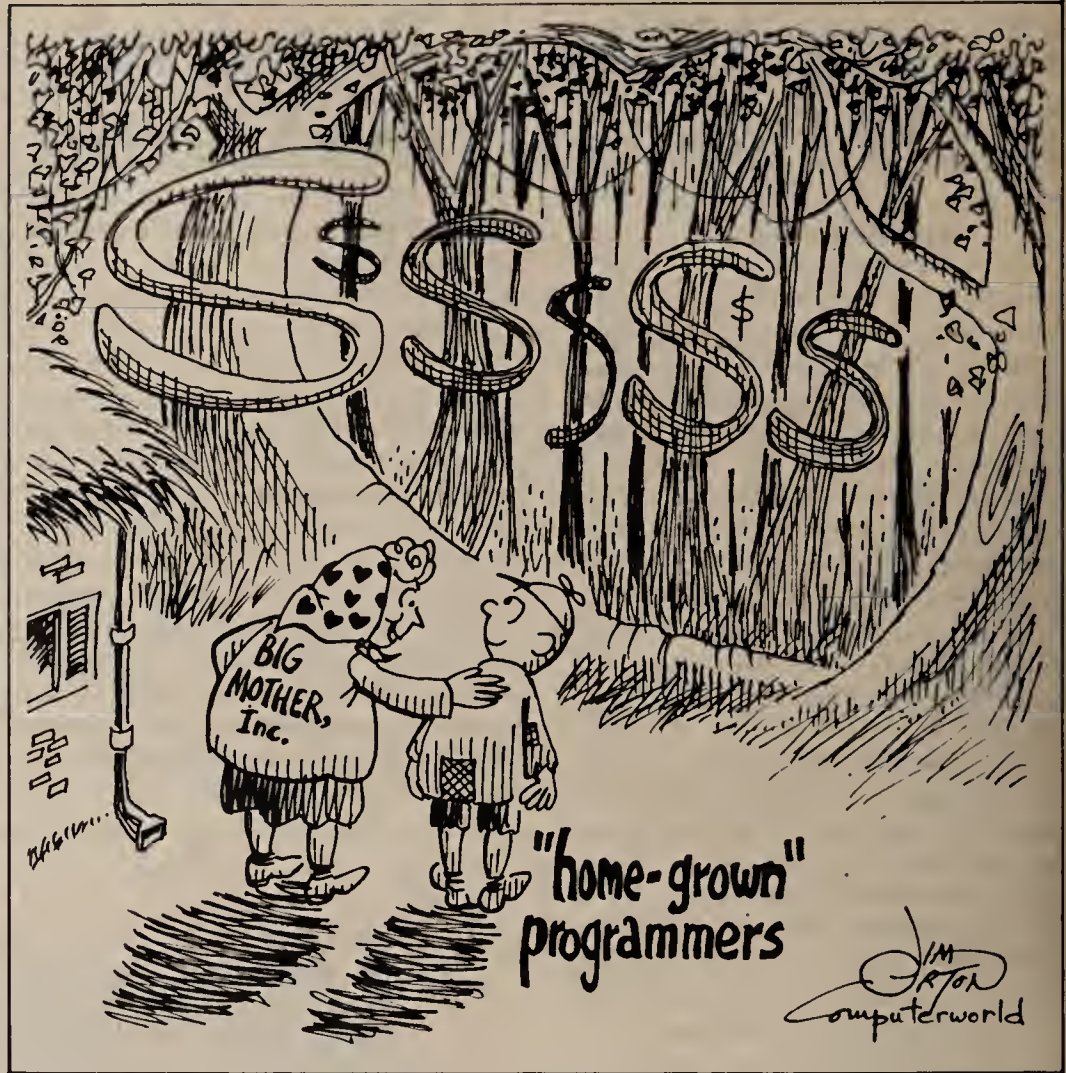
Ten Years Ago Sept. 22, 1971

WHITE PLAINS, N.Y. — IBM continued easing back towards bundled systems engineering.

The company announced it would provide individually tailored, fully operational programs at fixed prices for System/3 Model 6 users.

Under a new, fixed-price, extra cost option, it said it would provide RPG-II source code for programs designed under the Application Customizer Service for 3/10 users.

IBM reinstated on-site SE support at no charge to users of Class B software for the 360. The extra cost Model 10 Customized Source Code option was available immediately.



'Just remember, dear, here at home is where it's always cozy and safe...'

LETTERS

IDCMA Counsel Replies

In your article entitled "CCIA Charges Users 'Raped' by Decision Supporting Bell" [CW, Sept. 14], you stated that "Marks vowed that the battle to keep Bell out of the unregulated or 'enhanced' communications market will continue in the courts." This statement does not accurately report my comments and, more importantly, it does not accurately report the position of our client, the Independent Data Communications Manufacturers Association, Inc. (IDCMA). I did comment that the District Court's decision would undoubtedly be appealed. I hope the Department of Justice will do so; if not, others undoubtedly will. I did not discuss the likelihood of any specific party filing an appeal or appearing as an amicus curiae.

IDCMA is comprised of manufacturers of data communications equipment, sometimes referred to as customer-premises equipment (CPE). IDCMA's members already compete with AT&T. These companies do not offer "enhanced" communications services. In the proceedings before the New Jersey court, IDCMA asserted that AT&T's 1956 Antitrust Consent Decree required AT&T to offer CPE under tariff, and that the Federal Communications Commission's (FCC) new "regulatory" approach embodied in the Computer Rules did not provide an adequate surrogate for regulation. IDCMA's pleadings focused on CPE, not enhanced services.

Although IDCMA is primarily interested in policy issues dealing with CPE, the association has addressed — before the FCC, the Congress and the Courts — the separation needed between AT&T's regulated and unregulated activities to foster effective competition. IDCMA has consistent-

ly argued that, in order to limit (or prevent) the abuse of AT&T's control of the nation's telephone network, there must be meaningful separation between regulated and unregulated activities.

The FCC and Congress have recognized the need for separation between such activities, but neither has advocated separation sufficient to prevent anticompetitive conduct. For example, both the FCC's Computer Rules and S. 898 purport to require AT&T to separate its CPE activities from its regulated activities.

The Computer Rules, however, do not require any separation of manufacturing, research and development. S. 898 similarly does not require separation of manufacturing of the components and subassemblies that comprise CPE, again a major portion of the CPE business. These flaws must be eliminated if the words "fully separated affiliate" as used in the Computer Rules and S. 898 are to truly describe the relevant provisions.

IDCMA has not sought to keep AT&T out of unregulated or "enhanced" communications markets. Rather, IDCMA has worked for the adoption of sound policies that will provide meaningful safeguards to assure that AT&T's unregulated businesses do not compete unfairly by using cross-subsidy from, preferential information about, and other leverage derived solely from AT&T's control of the regulated telephone network.

An in-depth review of the rules prescribed by the FCC and in recent congressional proposals would highlight IDCMA's concerns.

Herbert E. Marks
Counsel for IDCMA
Wilkinson, Cragun & Barker
Washington, D.C.

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READER COMMENTARY/David Martin

RCA Employees Marking 'Black Friday' This Month

This month, some of us will mark a small, sad anniversary in the computer industry. It was 10 years ago, on Sept. 17, 1971, that RCA decided to get out of the computer business. At this distance, it's possible to look back with perspective and a sense of humor. I'd just like to share a few reminiscences and lessons:

All that summer there had been rumors that RCA was going to leave the computer business and these had been consistently denied by RCA management. RCA veterans have drawn the obvious conclusion from this: Never believe a rumor until management denies it.

On "Black Friday," the decision was made at about 2 p.m. at an RCA board meeting in New York and didn't filter down the chain of command to the bottom until after most people had gone home for the day. A lot of us heard about it first on the evening television news. It sure did make you lose your appetite.

The Monday morning after Black Friday, there was a long line at the copying machine. People had typed up their resumes over the weekend. A couple of days later a new rule was announced that people should not make more than 10 copies of their resume at a time. This was after some guy had made 700 copies.

After spending a weekend reading the want ads, many systems programmers suddenly developed a strong interest in learning Cobol.

RCA announced that it was leaving the computer field because "well-entrenched competition" made it impossible to make a profit. Several years later, in the IBM antitrust trial, a witness from RCA testified that it had all been an accounting error and

that actually RCA Computer Systems had gone into the black for the first time in 1971.

The week after Black Friday, RCA Computer Systems had its best sales week ever. Our customers were rushing to get the equipment that they needed for their future expansions before the source of supply dried up. It was too bad that we couldn't have announced that we were going out of business three or four times.

Headhunters Descend

Several different crews of headhunters came to town and set up shop in motel rooms near RCA systems programming headquarters. For a while it became a compliment, not a nasty hint, when your boss told you that he had seen a job in which you might be interested.

In the two-and-half months between Black Friday and the announcement of the deal with Sperry Univac, the RCA Computer Systems Division went from 11,000 employees to 2,500. Layoffs became a regular Friday ritual.

For those of us who lived through it, it helped us get our priorities straight.

After coming face-to-face with the possibility of losing our jobs and not being able to make mortgage payments, office feuding about the best way to program a DO-loop suddenly seemed very petty.

The demise of RCA Computer Systems Division. Yes, it was a great experience. I wouldn't have missed it for anything. I wouldn't go through it again for anything either.

Martin is an international liaison between Sperry Univac's American headquarters and their European subsidiaries.

READER COMMENTARY/Floyd McWilliams

Third Technical Maxim: One First Priority Only

Few people are aware of the depths to which some American corporations have sunk in attempts to regain their once great levels of productivity. The productivity crusade has even been extended into management information services (MIS) departments. Hidden away in the vaults of Gigundus Corp. is a folder stamped "Burn Before Reading," which details Gigundus' experiences in using nonhuman life forms to carry out repetitive tasks.

In one damp folder is the dossier of Octavia, an octopus that was trained to write Cobol programs. It was a tribute to American technology and ingenuity that Gigundus was able to create a moist cubicle that allowed Octavia to code and still be in the Programming Pool. Just as impressive was the manner in which Octavia was taught a sort of, well, octopus-latin in which her directions were given and results shared.

Octavia turned out to be a whiz as a programmer: she would think about one program, jot notes about a second and enter in a third on her tube, each being given a lower priority. It became a job around the Programming Pool to say, "Wasser priorissy?" — which is how it sounded when Octavia asked "What's the priority?"

Then came the day when a maintenance crew lowered a second tube into Octavia's moist cubicle. A little later, Proust, the manager of programming, assigned program PR0151 to Octavia, in addition to PR0130, PR0140 and PR0145, which she had already been working on.

"Wasser priorissy?" Olivia asked. "First, must be first," Proust replied.

"Wasser priorissy Pee, Ar, Oh, One, Shree, Oh?"

"One-thirty? It's still first priority, Octavia, must be," he replied before retreating to his office.

Being the hard worker she was, somehow Octavia squeezed a little more work out, although for the first time one of her programs bombed after it went into production. The human programmers watched in awe as those eight tentacles moved in a blotchy gray whirl.

It was but a week later that a third tube was lowered into Octavia's moist cubicle and she was given a third first priority. A new word, "real," came into Octavia's vocabulary. "Wasser real priorissy," she would wail, but to no avail.

The file on Octavia was closed shortly thereafter. Her last words, too, were recorded from her exit interview, obtained by a marine biopsychologist:

"There can be only one first priorissy."

Octavia is quite right. Whether you're human or cephalopod, there can be only one first priority. This is so important to every technical manager that I've codified it as the third maxim of technical management.

There can be only one first priority. As soon as management is unable, or unwilling, to decide which are the important projects and further, make the hardest decision of all — which of those is the single most important, human programmers and analysts will suffer the anguish of Octavia.

McWilliams is lead systems analyst for Harris Corp.'s RF Communications Division in Rochester, N.Y.

HUMAN CONNECTION/Jack Stone

What Does 'New User Readiness' Mean?

Undaunted by my troubled experiences during the installation of a small mini in Cairo ["Installation of Mini Leads to Adventure," CW, Sept. 14], I went full steam ahead to a site in Rabat, capitol city of Morocco, for the purposes of a survey prior to machine installation (thus guaranteeing I couldn't foul up machine types as I did in Cairo — at least not for the time being).

I quickly discovered that the customer organization — soon to be a first-time user — was at a high level of readiness to receive the mini and, because the situation was a perfect case for a textbook, I am using this week's article to share some of my findings to relate what I believe "new user readiness" means:

Some Findings

- Site management was enthusiastic about obtaining a computer capability. Even though the chief executive indicated that he had no formal DP technical education in the field, he did have prior senior manage-

ment responsibilities for the installation of a large and complex information system that turned out to be a nightmare. However, the experience seemed to have more than prepared him for a mini installation.

- The assistant chief executive had little computer background or experience and was in the process of reassignment, a set of conditions that typically signals a lack of interest. It turned out that he was very interested in the automation program because he anticipated some major DP management responsibilities at his new location.

- The senior secretary had substantial word processing experience in a prior assignment and was strongly supportive of a word processing capability at the site (word processing was one of the major applications scheduled for the machine). Further, she was willing to help organize and train the secretarial staff.

- The major data processing application planned for the machine is a conversion from an existing manual

system that was the responsibility of a single person since its inception. Although this person had no prior computer experience or training, he had completed numerous readings in the field and was anxious to receive in-depth training.

Staff Participation

- The secretarial staff indicated a strong desire to participate in the computer systems program and management evidenced a willingness to release employees on a planned and controlled basis for training and development.

- As is usually the case for new office system users, the best form of preparedness for the site is in the form of early access to WP capability. Ironically, WP machine time from a sister organization became available during my trip, so I helped the site management to arrange for this time, initially for training and later for document production.

- I was quite concerned about vendor maintenance as the new machine

is to be the first of its type in Morocco. Fortunately, the site manager from the sister group had already straightened out the policy and procedural problems, which included a provision whereby a completely redundant equipment only could be placed into standby status (rather than remain in the cartons). There were ironclad guarantees that the standby machine would not be used unless the primary machine went down (plus an understanding that, if the standby machine were used for operations in addition to the primary machine, the maintenance costs would increase to what I computed to be 20-fold). So, assuming that the vendor would provide trained personnel, I felt that the maintenance situation was under control.

- Finally, the machinery was to be located in a downtown office building — about what one would expect to find in northern Virginia — with electrical power to match (which, if you haven't visited there lately, isn't all that stable).

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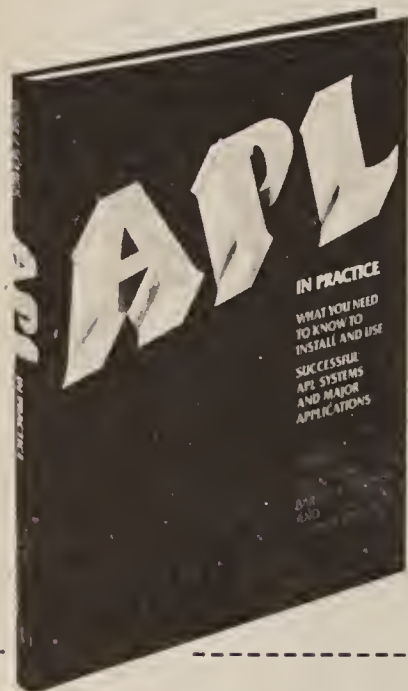
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LETTERS

'Hero' vs. TSO

In your article " 'Hero' Said to Best TSO in Programmer Support" [CW, Aug. 31], Hero was compared with TSO. In the comparison, some statements were made about TSO in an IBM 3033 and these run counter to our experience. I thought you might like some details.

First, I do not want to be considered a champion of TSO. It does have a horrendous appetite for system resources and there are a lot of packages available — CMS and Roscoe to name two — that can support a far greater user load given the same resources.

The article stated, "IBM's TSO . . . usually allows no more than 60 to 80 programmers to gain access to a 3033 at the same time." The following is a section of a one-day profile of our 3033s.

Batch Performance

No. Units	Active	Res.	No. Trans.
8.5	8.1	7.8	.2
6.6	5.0	4.0	.5
7.0	5.4	4.0	1.0
7.1	5.9	5.2	1.1
10.8	7.2	5.6	1.4
9.9	7.6	7.2	1.3
7.5	6.1	5.4	1.1
8.1	6.5	5.8	1.8
8.2	6.5	5.6	1.1

TSO Performance

No. Users	No. Trans.	Length (Sec.)	No. Triv.	Length (Sec.)
71.2	183.5	2.5	144.1	.4
105.9	284.6	3.2	228.8	.4
110.5	282.3	3.6	229.6	.5
99.1	284.3	2.4	238.8	.4
76.9	212.4	2.7	178.7	.4
78.2	223.5	2.1	188.7	.4
99.4	280.2	2.6	234.5	.5
97.6	284.2	2.5	239.7	.5
92.6	255.0	2.7	211.0	.4

The second 3033 shows a TSO user load that averaged 92.6 users throughout the day and a peak load from 10 a.m. to 11 a.m. that averaged 110.5. During that hour, overall response averaged 3.6 sec and trivial was 0.5 sec, which is quite acceptable. Note, too, that this system was also running some batch work. During the 10 a.m. to 11 a.m. period, four batch initiators were also resident. And during the day shift, 497 batch

jobs ended execution on that system.

During the peak period, for one 10-minute period the maximum user load was 122 and the minimum was 112. I have observed peaks of 126 on other occasions. I believe that if the batch load were completely removed from this system and the main storage were increased, the simultaneous user load could be raised to substantially higher levels.

In summary, we are regularly experiencing user loads of more than 50% higher than the peaks discussed in your article and, as the above shows, even at those user loads, response is quite good.

Edward J. Williams
Vice-President

Mellon Bank N.A.
Pittsburgh, Pa.

. . . And 'Superwylbur

In the article " 'Hero' Said to Best TSO in Programmer Support" [CW, Aug. 31], the writer implies that Hero's main competitor is TSO.

In fact, there are already several competing products that outperform TSO, both in their ability to accommodate large numbers of users and in their provision for a far more reasonable human interface to the computer.

Among these is Superwylbur, a product that has been commercially available through Optimum Systems, Inc. for more than six years.

John Ray Paseur
Superwylbur Product Manager
Optimum Systems, Inc.
Rockville, Md.

He Missed One

Walter Murphy presented a humorous insight into current euphemisms and acronyms in "Cultivating New Development Ground" [CW, Spet. 14]. However, he missed one — an agrarian specialist (farmer) sitting on his porch should call it a Porch: Platform, Outdoor, Rocking Chair Habitat.

William L. Hirst
Plantation, Fla.

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LETTERS

Eight-Bit Word Lengths

In "Datapoint, Tandy Build Local-Net Architecture" [CW, Sept. 14], the last sentence states, "The TRS-80 II features an 8-bit word length at a time when 16-bit micros, such as IBM's Personal Computer, have emerged." This statement incorrectly implies that the IBM Personal Computer uses other than an 8-bit word length.

The Intel Corp. 8088 processor chip that is used in the IBM Personal Computer has an 8-bit word length. Its function was to ease the migration to Intel's 8086 16-bit processor. The 8088 offers the instruction set of 8086, but has an 8-bit word length for compatibility with other 8-bit processors.

Stated another way, the Intel 8088 was designed to compete with the Zilog, Inc. Z80 and Motorola 6809, which were replacing Intel's 8080 processor chip. Both the Z80 and 6809 are 8-bit processors with 16-bit instructions and registers.

In my opinion, the only thing innovative about IBM's Personal Computer is the 9-bit memory with error checking.

Also, in your article "IBM's Personal Computer Paves New Corporate Path" [CW, Aug. 17], the chart on Page 4 incorrectly lists the Radio Shack's TRS-80 Model II when all the facts and figures are about the TRS-80 Model I.

Lawrence Rizzo
President

Rizzo Data Systems Corp.
Bridgeton, N.J.

Defining Roles

I agree 100% with Randy Lee ["Test for What?" CW, Aug. 31] that you "don't hire a software engineer to maintain your software — you hire a technician," and I strongly disagree with a number of other writers who seem to advocate tossing all computer science programs out the window. I believe we need to sit down and quietly reflect on the true nature and role of computer scientists (or software engineers, if you prefer).

The ultimate role of a computer scientist is to study a system in its entirety (including CPUs, peripherals, communications gear, operating systems, utilities, compilers, applications software, user interaction and so on) and attempt to maximize its performance and utility.

The means by which this is accomplished may vary greatly depending upon the environment in which the computer scientist is placed. If he is working in a customer environment, this may mean performing mathematical analyses or simulations, or observing terminal users at work and soliciting opinions from them regarding terminal use or gathering statistics on various aspects of a system. Ultimately, it may mean recommending that a particular unit be replaced with another variety. It may also mean evaluating and recommending a new compiler on the market, or writing software to support some new piece of hardware or writing a test package to allow application programmers to get their work

done faster.

A computer scientist working for a vendor may be involved in designing a new operating system or compiler. He may evaluate proposed hardware designs in terms of their effect on software development.

In some cases, a computer scientist may himself function as an applications programmer if he works for a company that does process control, industrial automation, numerical control or laboratory analysis. Since a computer scientist normally receives training in computer architecture and basic circuit design as well as in mathematics and software design, this role is ideal.

In many cases, companies hire computer scientists and make technicians of them. They assign them to modify drivers, install compilers, install

patches to operating systems and perform a variety of duties that are really technician's functions.

There is nothing wrong with having them do this; however, this should not be the primary function of people with advanced degrees. A person with an advanced degree enters the "professional" class, but people with advanced degrees in computer science are very rarely managed as such. They are almost always managed as technicians.

This is an injustice both to them and to their employers.

It seems to me we need to sit back and think about how we might use these people more effectively rather than just toss them out the door.

P.A. Anderson

Chicago, Ill.



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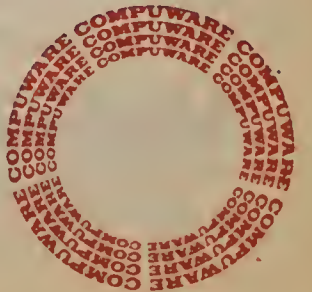
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See Glossary of Terms
On In Depth/10

MRP II: Manufacturing Resource Planning

By Oliver W. Wight

Before the computer, inventory control systems launched orders and the expediting system used a shortage list, typically generated by staging or accumulating material, to try and pull through the right material. Expeditors looked at the production schedule for the next few weeks, got the bill of material out, pulled the required material out of the stockroom and made up a shortage list.

Evolution of MRP to MRP II

Books on inventory management in the '50s, '60s, and even into the early '70s usually started by saying "Inventory management is concerned with two questions: one, when to order, and two, how much to order." Because the best the precomputer inventory control people could do was to launch orders, inventory management was conceived of as an order-launching function.

During the '60s especially — when there was a great fad for mathematical, statistical methods — the order point (average demand X lead time + safety stock) was given a great deal of attention. Statistical methods for calculating safety stock were developed

and *exponential smoothing* became a popular technique for determining average demand.

Being a weighted moving average, *exponential smoothing* is in no way a superior moving average. Its prime advantage in the early days of the computer was that it required less storage than a moving average. Today, a moving average is far more preferable because users do not attribute any magical forecasting qualities to a moving average, while they often do tend to attribute these to exponential smoothing. Since computer storage capacity is no longer a determining factor in system design, exponential smoothing has outlived its usefulness.

In the meantime, Materials Requirements Planning (MRP) was being used by companies, particularly in their heavy industries like machine tool and farm implement manufacturing. Early MRP systems were very crude, usually operating in monthly time periods and being recalculated once each month. In some cases, they weren't even recalculated; the new month was simply added on to the old requirements.

A technique developed in the early '60s was *net change MRP*, where the entire MRP record is kept on the computer rather than being recalculated periodically. Typically, changes are made on a daily basis.

This could be far more responsive than the regeneration approach, but even the early net change systems were crude.

The original net change system used at J.I. Case in 1961 had three weekly and seven monthly time

(Continued on In Depth/2)

This material is drawn from a forthcoming book entitled MRP II: Manufacturing Resource Planning, by Oliver Wight, which will be published in October. The 200-page hardcover volume will sell for \$25 and is available from Oliver Wight Ltd. Publications, Inc., P.O. Box 435, Newbury, N.H. 03255.

IN DEPTH

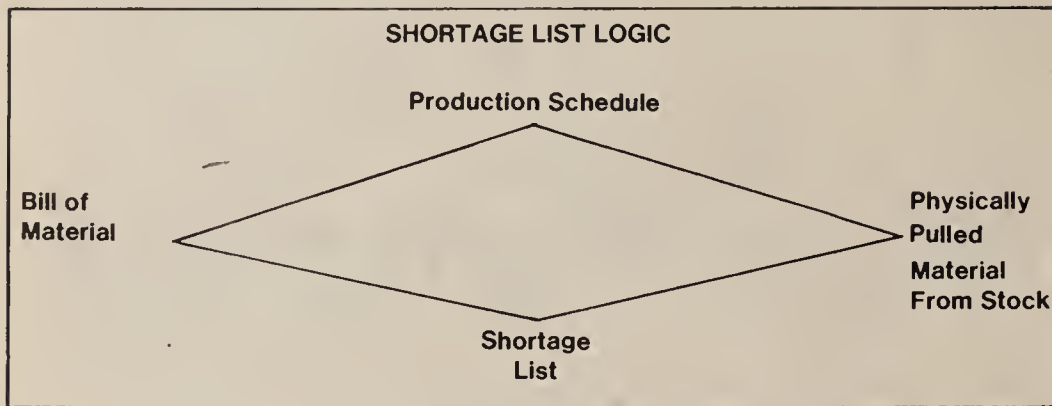


Figure 1

(Continued from In Depth/1)
buckets. It is true the system could be used for inventory ordering, but the three weekly time buckets did not give much more of a scheduling horizon than a shortage list could.

As computers got faster and grew in capacity, it became standard practice to use time buckets no bigger than a week. Today, there are bucketless systems that calculate requirements by the day. A standard MRP system is considered to have a minimum re-

quirement of at least weekly recalculation. The typical net change system introduces changes on a daily basis.

MRP went through four basic steps in its evolution.

First, it was an inventory control technique — an order-launching technique. Consider a bearing company making a product with four basic components: inner race, outer race, ball and retainer. The order point would have ordered each of these independently. MRP would order them to come through at the same time. Nevertheless, MRP in its early installations — and for that matter in the bulk of the installations today — operates primarily as an inventory control or order-launching system.

Second, it evolved into a "priority planning system." Even some early MRP systems, such as the one at J.I. Case and a predecessor system at American Bosch-Arma, had a re-scheduling capability. The notion that material already on order should be reviewed to see if it needed to be moved into an earlier or a later time period was the beginning of MRP's developing into a scheduling system.

However, it took many more years, until the early '70s, before the simple concept came through clearly that a master schedule had to represent what was really being made. Before that, if a part was scrapped and could not possibly be completed on the original schedule date, the original master schedule was left unchanged and the dates for all the matching components stayed as they were originally.

Components that were really needed would therefore be run later than components that were not needed because the product could not actually be built. The idea of getting feedback on what was really happening and keeping the master schedule up to date made MRP a true priority planning system. The logic of MRP is exactly the same as the logic of the shortage list shown in Figure 1:

The problem with the shortage list, of course, was that it did not look very far into the future, and it was very difficult to update. If the schedule changed drastically, the only thing that could be done was to take the material off the factory floor, put it back into stock and then physically repull it against the new schedule.

MRP is merely a formalization of the old informal system — the shortage list. The logic is identical: It is the fundamental manufacturing equation that says, "What are we going to make, what does it take to make it, what do we have and what do we have to get?" But MRP can look out a year — two years if necessary — into the future. And it can break down requirements into weekly or even daily increments to show what is needed in what sequence.

Most important in the ever-changing environment of manufacturing — where the forecast is wrong, machines break down, tooling doesn't work, processes that worked yester-

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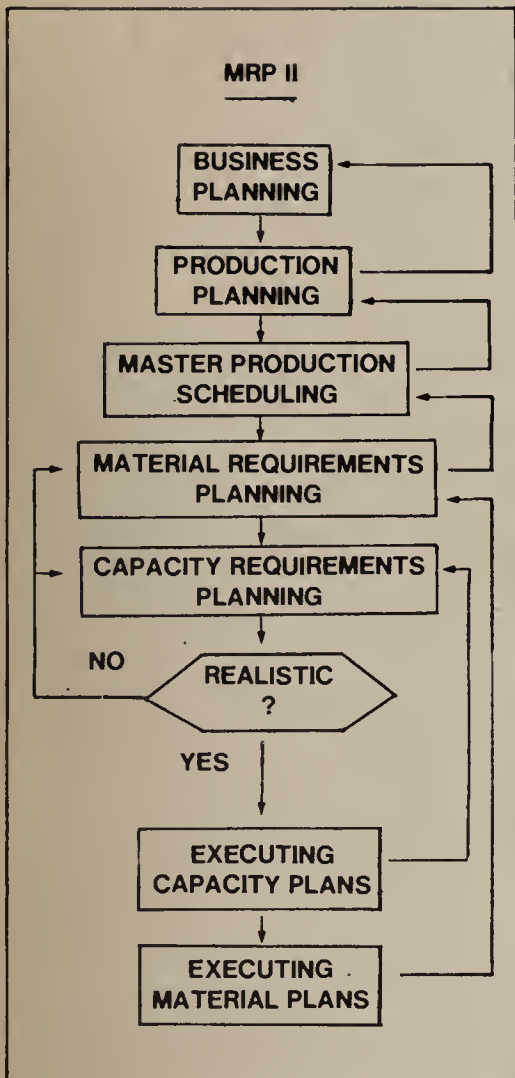


Figure 2

Fourth, it evolved into MRP II: manufacturing resource planning. This was a natural evolution from the closed-loop system, and, like all the steps in the evolution of MRP, it was the users that developed it, not consultants or college professors.

Several users recognized that they could tie the financial system right into the closed-loop MRP system. The production plan in units is really the basis for the business plan in dollars. The master production schedule

represents the shipping budget in a make-to-order company or transfers to inventory in a make-to-stock company. (Most companies are a combination of both, of course.)

The material requirements plan in units can be converted to dollars to show how many dollars by product line are going to be purchased from the vendors by time period, as well as how many dollars by standard labor will have to be "purchased" from the factory. No longer will there be

two separate inventory records, one in units and one in dollars. The record in units will have to be kept at a very high level of accuracy, (more about this later), to make MRP work. This same record can be converted to dollars for the financial people.

There is a principle here: *It's difficult to make a system designed primarily for accounting work as an operating system, but it's easy to make an operating system work for the accounting people.*

(Continued on In Depth/4)

day don't work today, key operators are absent; vendors deliver late and engineers make changes — in this environment of constant change, the value of MRP is that it can reproject the shortages over and over again.

One company that installed an MRP system reduced shortages in its assembly department from an average of 300 to 500 a week to an average of three to five. This is what can be done when a system can predict shortages and people can be working on next month's shortage this month, rather than when it occurs.

Third, MRP then evolved into what was called a closed-loop system. After MRP could work as a scheduling system, it became obvious that although it was the heart of a system, other elements were also required. These elements are shown in Figure 2 and will be discussed later in more detail. Obviously, MRP by itself did not constitute a system without:

- The capacity requirements planning to determine what capacity was needed to produce the material in the material plan.
- The means for tracking to see if that capacity was really being achieved.
- The techniques for communicating the schedule to the factory and to the vendors so that they could execute them.

The term "closed loop" also conveys the idea that there must be feedback to make sure these plans can be executed because if they cannot, they will have to be changed. *Obviously, the first priority is to execute the plans.* Too many people feel that, because MRP facilitates change, the name of the game is changing the plans. That is a last resort.

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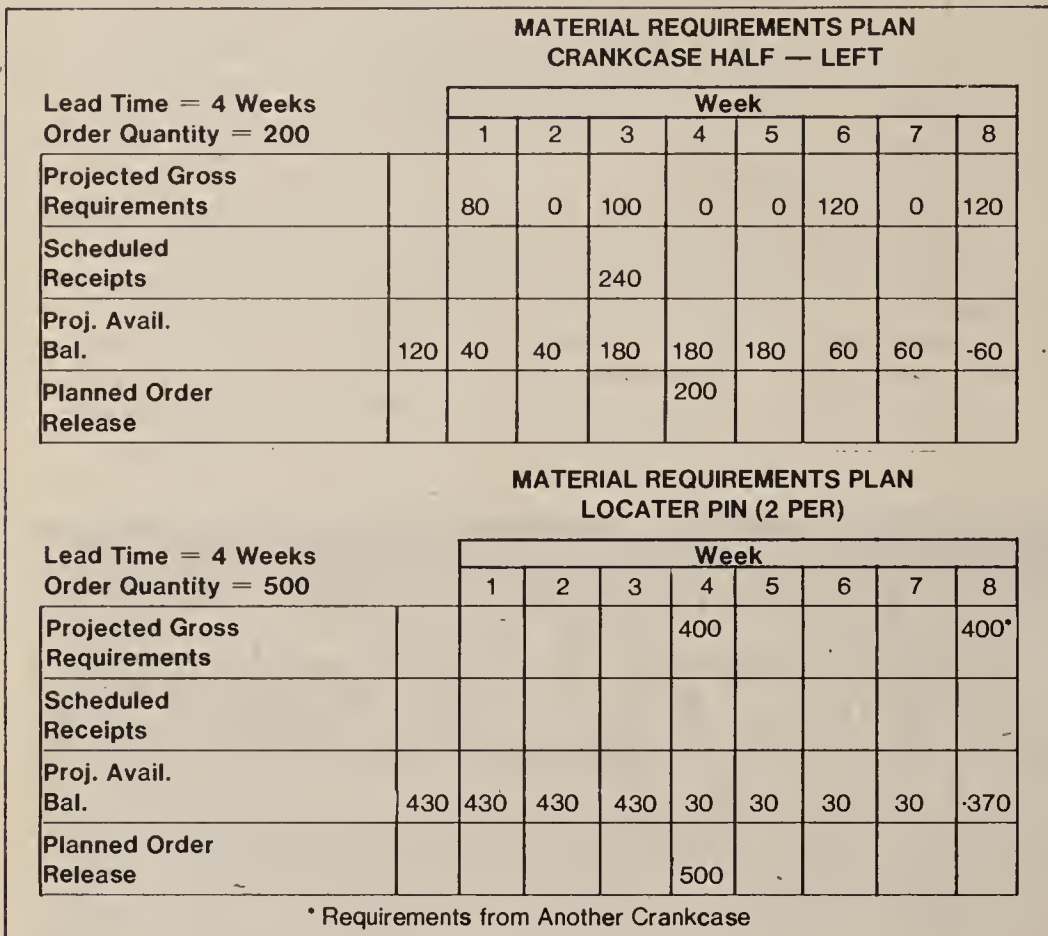


Figure 3

(Continued from In Depth/3) The annual physical inventory is a good case in point. Chances are the typical company posts as many errors as corrections when it takes the annual physical. Taking the physical

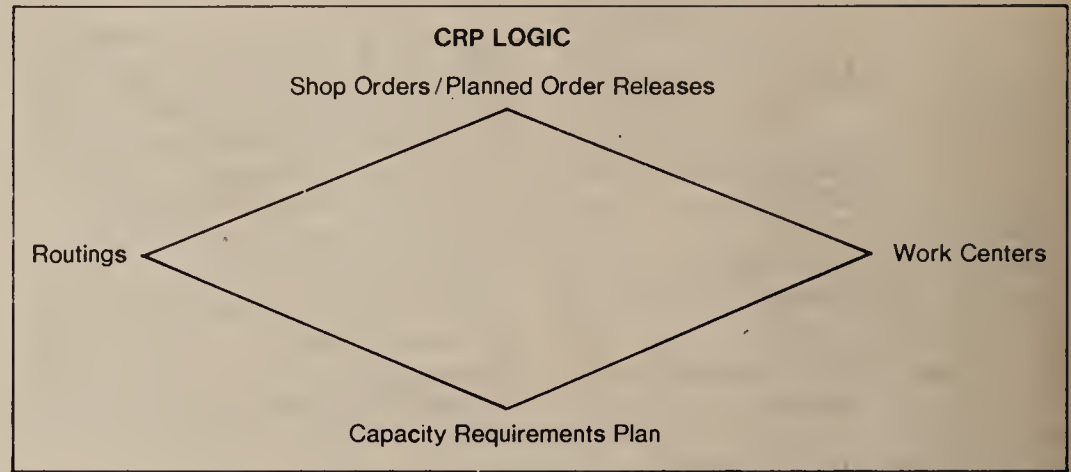


Figure 4

**CAPACITY REQUIREMENTS
SUMMARY (IN STANDARD HOURS)**

Week	Hours	4-Week Total	4-Week Average	Week	Hours	4-Week Total	4-Week Average
1	294			5	286		
2	201			6	250		
3	345			7	315		
4	210	1,050	263	8	257	1,108	277

Figure 5

inventory once a year really does not allow for checking to find out how errors occurred. In an MRP system, the inventory will be "sampled" daily using cycle counting to monitor inventory record accuracy. If the inventory records are kept accurate enough to make MRP work, they will be more than adequate for financial purposes because the financial people are concerned primarily with dollars. A 95% inventory record accuracy item by item, for example, will translate into 99% accuracy plus, in terms of total dollars, because the inventory shortages cancel the inventory overages.

But the most important thing to come out of MRP II was not the technical refinement of combining the financial and the operating system. The most significant development in the evolution of MRP to MRP II was that it became a company game plan: a way to plan and control all the resources of a manufacturing company — a common plan that marketing, manufacturing, finance and engineering could use to work together. In the past there was no good planning tool. Those companies that have really made MRP II work well are those that have seen its potential as a company game plan.

The logic of the closed-loop MRP system is in every cookbook. The bill of material says, "Turkey Stuffing takes one egg, seasoning, bread crumbs." The routing says, "Put the egg and the seasoning in a blender." The blender is the work center. The master schedule is Thanksgiving.

But in manufacturing, things are more complicated. There isn't just one product; there are many. The lead times are not as short as going to the corner store. The work centers are busy, rather than waiting for work, because some of them cost a third of a million dollars or more,

and it simply is not economically wise to let them sit idle and to have excess capacity. The sales department will undoubtedly change the date of Thanksgiving several times before it actually arrives! Not through perversity, but because the customers want and need some things earlier or later.

Volume of activity in manufacturing is monumentally high; something is happening all the time. Change is the norm, not the exception. But the point is that the logic of MRP is very straightforward. Figure 2 shows the closed-loop system. The production plan and the business plan are very much intertwined. The business plan is simply the expression of the production plan in dollars.

The production plan is the rate of production for a product family expressed typically in units, for example: "We want to produce 1,100 Model 30 pumps per week." The production plan is made by taking into account current inventory, deciding whether inventory needs to go up or down during the planning period, projecting the sales forecast and determining the rate of production required to maintain, raise or lower the inventory level. In made-to-order business, as opposed to a made-to-stock business, the order backlog, rather than the inventory, is the starting point for the production plan.

A basic business plan is simply an extension of a production plan in units into dollars. Clearly, the complete business plan in a manufacturing firm will include research and development and other expenses not directly related to production, manufacturing and purchasing. But the core of any business plan in a manufacturing enterprise is the production plan. With MRP II, they are

(Continued on In Depth/8)

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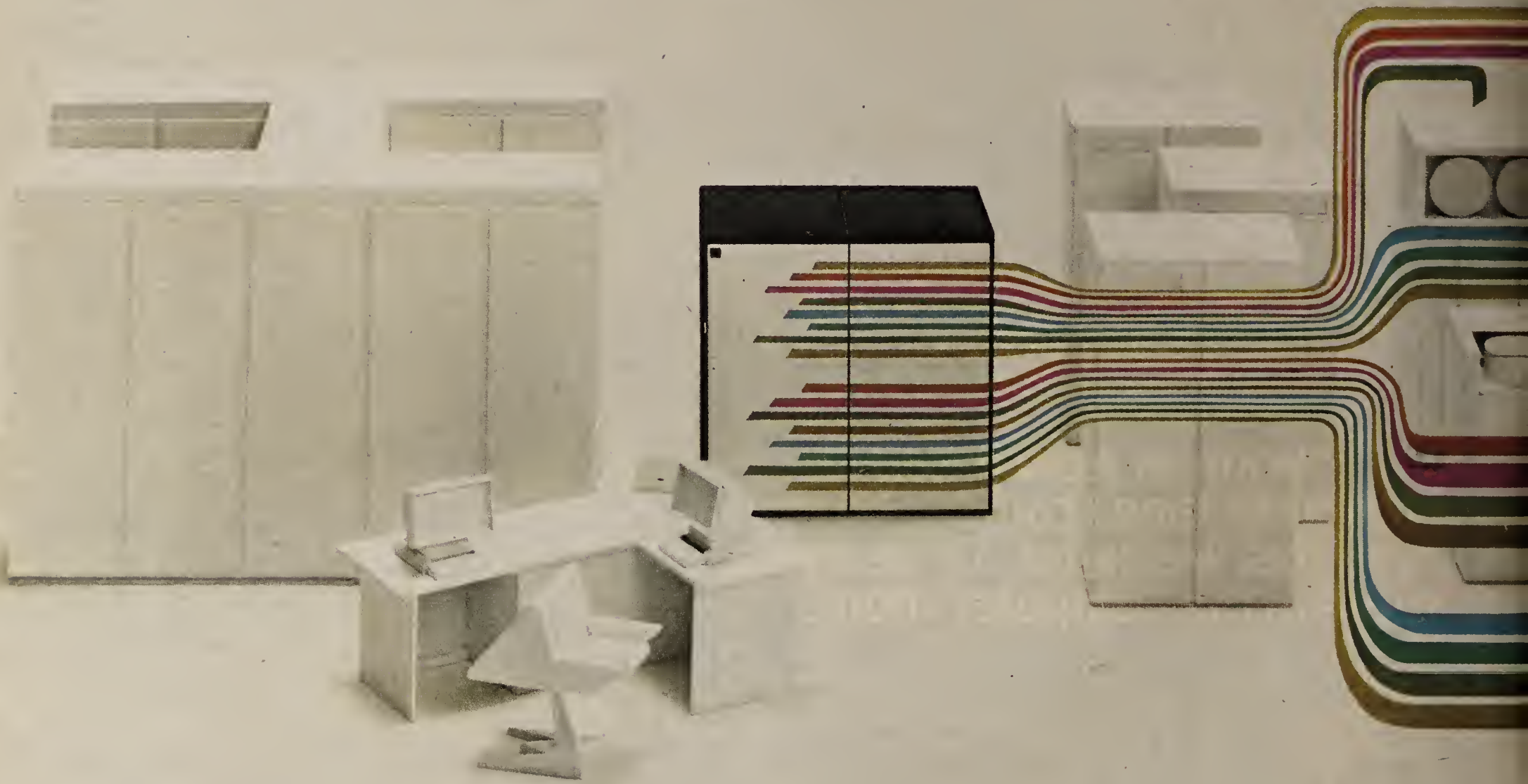
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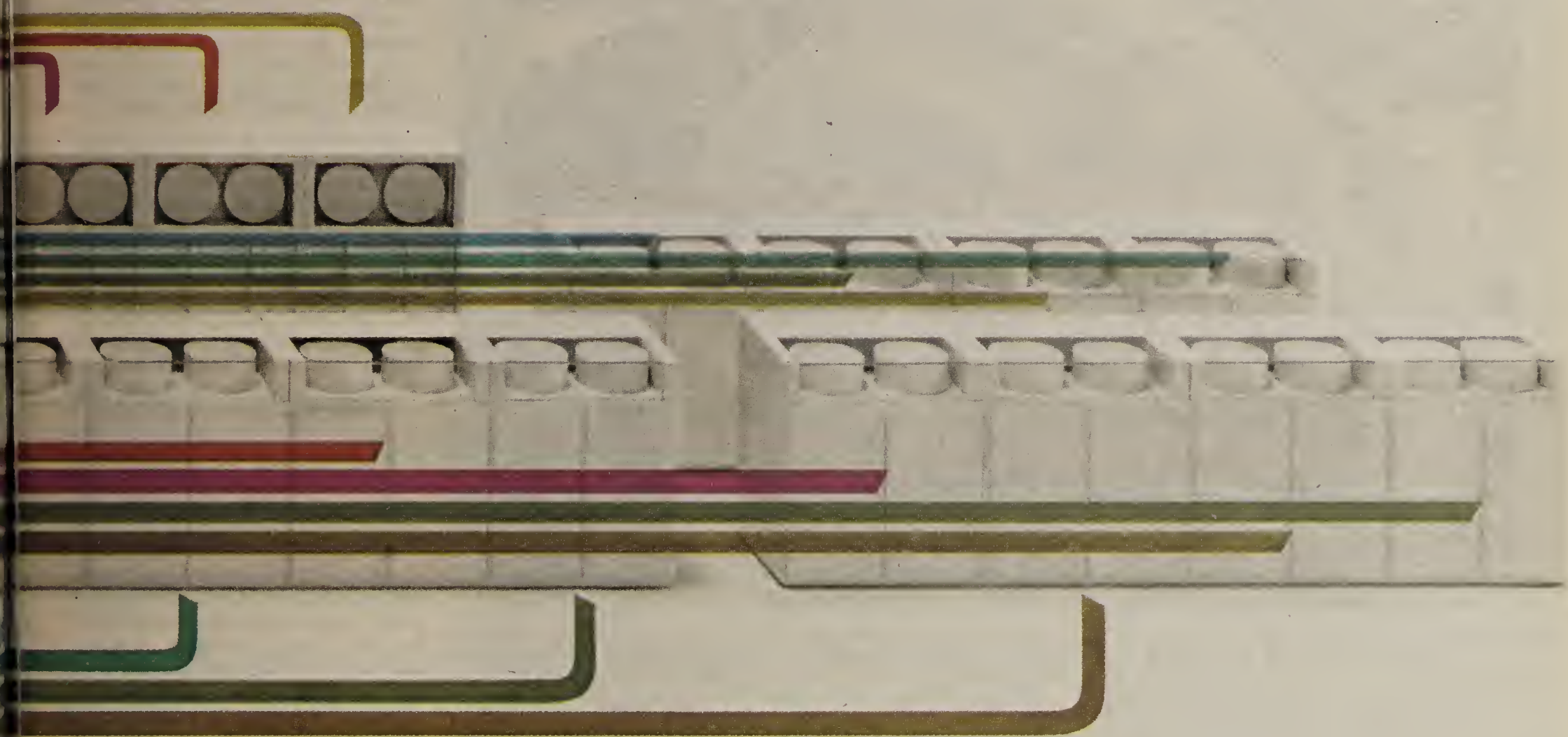
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IN DEPTH

(Continued from In Depth/4)
interdependent plans; as the production plan is updated, it is extended into dollars to show it in business money.

The closed-loop MRP system then takes a master production schedule ("What are we going to make?"), explodes this through the bill of materials ("What does it take to make it?") and compares this with the inventory on hand and on order ("What do we have?") to determine material re-

quirements ("What do we have to get?"). This fundamental material requirements planning — and shortage list — logic is shown in Figure 1.

Figure 3 shows the material requirements plan for the left crankcase half for a moped engine and also for the locator pin that goes into the left half of the crankcase. The projected gross requirements come from the master production schedule plus any service parts requirements. Scheduled receipts are the orders al-

ready in production or out with the vendors. The projected available balance merely takes the on-hand figure — in Figure 3, 120 for the left half of the crankcase — and projects it into the future to indicate when material needs to be ordered or rescheduled.

The planned order releases at one level in the product structure — in this case 200 "crankcase half left" — become the projected gross requirements at the lower level. The 200-unit planned order release in Period

4 for the crankcase half left becomes a projected gross requirement of 400 locator pins in Period 4, since there are two locator pins per left crankcase half.

Most MRP systems also include pegged requirements — a way to trace where the requirements came from. The pegged requirements for the locator pins would indicate that the 400 in Period 4 came from the crankcase half left and the 400 in Period 8 came from another product. Pegged requirements show quantity, time period and the higher level item the requirement came from.

MRP not only tells the planner when to order, it also tells when to reschedule. If the scheduled receipt of 240 of the left crankcase halves were due in Period 5, the MRP system would notify the planner to reschedule the 240 to Period 3, since there would be 40 units going into Period 3 and a requirement for 100, giving a projected negative balance.

This rescheduling capability is one of the strong features of MRP. It tells the planner when materials should be moved in and moved out to cope with the ever-changing situation in a manufacturing company.

Note also that the fact that the crankcase half needs to be rescheduled in no way changes the planned order releases. It only changes the required date on a scheduled receipt. The requirements for the locator pins do not change, for they are already released into production to cover the scheduled receipt for the crankcase halves. The requirements for more locator pins are to cover orders not yet released to production.

The bill of material is the instrument for converting planned order releases at one level into projected gross requirements at a lower level. The bill of material for the crankcase half left, for example, would show that two locator pins per crankcase half were required.

A material requirements planning system, then, signals the planner to release shop orders and generates planned order releases, which can be used to produce a schedule to be used with the factory and the vendors. Capacity planning for the manufacturing facility follows the same general logic as the material requirements planning shown in Figure 1 on In Depth/2. Figure 4 on In Depth/4 shows this capacity requirements planning logic.

The remaining operations on released shop orders and all the operations on planned order releases are "exploded" through the routings (bills of material of operations) and posted against the work centers (an inventory of capacities). The result is a capacity requirements plan in standard hours by work center showing the number of standard hours required to meet the material requirements plan, which is a product of the master production schedule, which is derived from the production plan. It is important to note that every



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thing in a closed-loop MRP system is in lockstep. If the capacity to meet the material requirements plan cannot be obtained either through a company's own manufacturing facilities subcontracting or purchasing material on the outside, the master production schedule will have to be changed. But that is the last resort. The objective is to make the master production schedule happen.

Operations scheduling involves assigning individual schedule dates to the operations on a shop order using scheduling rules. Scheduling rules would typically be similar to these:

1. Allow two days for inspection (This is a matter of judgment).
2. Round the standard hours up to the nearest day.
3. Allow X days for queue time.
4. Release work to stockroom one week prior to first operation.

The routing for the locator pin discussed above might have the following operations:

1. Cut off.
2. Rough turn.
3. Finished turn.
4. Inspect.

The need date for the completion of the locator pin would be generated by the material requirements plan. The start date for the locator pins would be determined by the lead time, which would be calculated through operations scheduling using the above scheduling rules.

If two days were being allowed for inspection, the finished turn operation would have to be completed two days before the need date. If three days were to be used for the finished turn operation, that would move rough turn back to five days before the need date. In this way, schedule dates would be assigned.

MRP Reviews

It is important to recognize, however, these dates would be only in the computer. The finish dates would not appear on the shop order released to the factory because MRP would be reviewing the need date constantly to see if it had changed.

Each shop order and planned order release then will show the standard hours required and the time period in which these standard hours are required. Capacity requirements will now be posted against the work center using the logic in Figure 4, and a capacity plan, as shown in Figure 5, will be the result. This is a summary in standard hours by week. There would be a detailed plan to back it up, showing the shop orders and planned order releases for each part that was generating capacity requirements.

The capacity requirements summary in Figure 5 extends over an eight-week period. In practice, this would typically be projected over a far longer period, of course. A typical manpower plan would extend three to six months into the future and would be calculated weekly. A facilities plan that would be used for determining

what new machine tools were needed typically would be calculated once every two to three months and extended three to four years into the future because of the lead time for procuring machine tools.

Value of MRP

One great value of MRP is that it projects planned-order releases. These planned-order releases are used to:

1. Generate lower level material requirements.
2. Keep lower level material requirements in the right time periods as higher level schedules change.
3. Generate capacity requirements.

This ability to see capacity requirements ahead of time is especially important to good manpower planning, meaning less overtime and less need to hire and lay off people on a short-term basis.

The most important information for the foreman is that on the average hours he must plan to turn out. This production rate is usually calculated as a four-week average (using the capacity requirements summary shown in Figure 5) because the individual weekly hours are not particularly significant. The variations between these hours are more random than real. What the foreman needs to know most is the average rate he must man for the job.

Many people have tried to develop elaborate computer load-leveling systems because they were alarmed by the weekly variation in the apparent load shown in the capacity requirements plan. These variations are random. They are exaggerated by the fact that capacity plans are usually done in weekly time periods, and any foreman knows the hours never materialize exactly as they are shown on the plan. The most important thing is to know the average rate of output required so manpower can be planned accordingly.

In Figure 5, the four-week averages are 263 standard hours for the first four weeks and 277 for the second four weeks, or an average of 270 standard hours. Now is the time when the capacity planner must determine whether that capacity requirement can be met. The first step is to find out what the output from the work center has been over the last few weeks. This is called demonstrated capacity. (This term, coined by Dave Garwood, is very useful in describing the present capacity of a work center as opposed to its potential capacity when all shifts are manned and so on.)

It is the job of the capacity planner to then determine whether or not the current capacity is sufficient; what needs to be done to get the capacity to meet the plan; or, as a last resort, to feed back information that the plan cannot be met.

If the plan cannot be met, the master schedule and the production plans will have to be changed. If, for example, a company has one broach

and it is the only one of its type available because it was made specifically for this company, it could well become a bottleneck. If the capacity plan indicated that more hours were required at the branch than could possibly be produced, the master schedule would have to be changed to reflect this.

Once again, however, it is important to emphasize that this is the last resort. The job of the capacity planner is to get the capacity needed to meet the plan.

If there is any problem that exists in practice with capacity planning, it is that people expect the computer to do the capacity planning and do not recognize that all it can do is generate numbers to be given to an intelligent, experienced person — the capacity planner — for use in working with other people to fix capacity problems.

When it is agreed that the capacity requirement can be met, an output control report is set up. If, for example, the average rate of production required was 270 hours per week (the eight-week average for the capacity requirements summary shown in Figure 5), the actual standard hours produced would be compared

with the requirement and the deviation from this plan would be accumulated. In a typical system, if the deviation from the plan in standard hours equaled one-half week (135 hours in this case) or more, action would be indicated.

This is a true exception system and a true capacity control system where the actual performance is measured against the plan. In practice, it has proved to be far superior to the classical machine load reports that showed huge backlogs in the past due and current time periods (because of order launching and expediting) and showed dramatic variations in output requirements week to week, which never really materialized.

The capacity planning and output control reports are concerned with capacity. The dispatch list is concerned with priority. The dispatch list is generated daily, or as required, and goes out to the shop floor at the beginning of the day. It shows the sequence in which the jobs are to be run according to the scheduled date for the operation in that work center.

The movement of jobs from work center to work center is put in to the

(Continued on In Depth/12)

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IN DEPTH

ABC CLASSIFICATION — Before computers, practitioners found that ranking inventory items by annual usage in dollars would tell them how best to use their scarce resource — manual posting of inventory records. Low-value items were typically put on a simple visual review system to avoid having to make all the necessary inventory entries. With computers, the scarce resource is no longer posting inventory records, but instead people's time. The ABC classification is still used to determine such things as which items should be cycle counted most frequently and which should have the largest lot sizes.

The basic principle involves breaking the inventory down into three categories, where, typically, the top 20% (ranked by annual usage in dollars) are called the A items (normally accounting for 80% of the dollar activity). The next 30% are B items and the remaining 50% are C items, which usually account for about 5% of annual dollar usage.

ANTICIPATED DELAY REPORT — A report usually submitted daily from the factory and purchasing to the planners telling them of any shop orders or purchase orders that are anticipated to come in later than their required date. The closed-loop system requires this feedback and takes the stance that silence is approval.

BACK ORDER — An order created to withdraw a required item, which is not currently in inventory, when it becomes available.

BILL OF MATERIALS — (See also Planning Bill of Materials, Indented Bill of Materials.) A listing of the components required to manufac-

An MRP Glossary

ture a product in product structure format. A bill of materials is similar to a parts list, but usually shows how the product is fabricated and assembled — that raw material is used to make fabricated components, the fabricated components go into subassemblies, the subassemblies then go into an assembly and so on. This is usually done by showing the bill of material in indented format.

BUCKETLESS SYSTEM — The original MRP systems time-phased material requirements, scheduled receipts, projected available balance and planned order releases into time periods, usually monthly or weekly. In DP slang, these time periods were called "time buckets." In this type of system, the number of time buckets had to be determined as the system was designed. If planning was to extend a year into the future, every item had to have 52 weekly time buckets allocated to it.

Modern computer systems, called bucketless systems, do not require time buckets because they maintain such files by date and sort them as required.

BUSINESS PLAN — The overall plan for the amount of dollars to be shipped, the amount planned to be in inventory or order backlog and the amount to be produced. This is the basic business plan in a manufacturing company. The complete business plan would probably also include other planned expenditures not directly connected with the manufacturing func-

tions, like research and development.

CAPACITY CONTROL — Monitoring actual output against plan for a work center or centers. The input/output report is usually used for capacity control.

CAPACITY REQUIREMENTS PLANNING — A time-phased MRP not only releases orders, but it also generates planned orders used to create lower level material requirements. Capacity requirements plans can be generated then by taking into account, by work center and by time period, the hours needed to produce both the open shop orders and planning shop orders.

CLOSED-LOOP MRP — A system built around material requirements planning and also including production planning, master production scheduling, capacity planning, means for executing the capacity plans — such as the input/output report for monitoring it — and means for executing the material plans, such as the dispatch list or the vendor schedules. Implicit in the concept of a closed loop system is the feedback from vendors and from the shop floor using the input/output report and the anticipated delay reports.

COMPONENT INVENTORY — The word component embraces any inventory item used to make another; a raw material, a part or subassembly can be a component of another product.

CYCLE COUNT — Regular daily counts of items in stores. Typically a cycle count approach would be to count some items each day so that all items were counted at least once a year. Cycle counting should be viewed as a quality control function. Its major purpose is not to correct inventory records that are wrong. That's just a by-product. The major purpose is to monitor the process through sampling to make sure that inventory record accuracy is at or above the required level.

DEPENDENT DEMAND — Demand on an item is called dependent when it can be calculated from the need to manufacture or replenish inventory for a higher level item. A part that goes into a subassembly has dependent demand. If it is also sold directly to customers as a service part, it also has independent demand. A raw material later converted into semifinished inventory has dependent demand. Demand on the semifinished inventory is likely to be dependent demand unless that semifinished inventory is sold directly to customers. Dependent demand requirements should be calculated using a technique like MRP rather than a forecast using order point techniques.

DISPATCHING — The selection and assignment of jobs at an individual work center.

DISPATCH LIST — A schedule for a work center — usually generated by computer and issued daily — showing the priority sequence of jobs to be done at that work center. Priorities on the dispatch list are kept up to date by the material requirements planning system.

DISTRIBUTION CENTER — Warehouses used by companies that carry finished goods inventory to keep the inventory close to their customer's area. A typical company, for example, might have a manufacturing facility in Philadelphia and a distribution centers in Atlanta, Dallas, Los Angeles, San Francisco and Chicago. The term distribution center is synonymous with the term branch warehouse, although it has recently become more commonly used. A warehouse that serves a group of satellite warehouses is usually called a regional distribution center.

DISTRIBUTION REQUIREMENTS PLANNING (DRP) — Material requirements planning (MRP) was developed originally as a way to order material to support assembly operations. After it had been in use for a number of

years, people began to recognize that distribution inventories also have levels. Branch warehouses draw inventory from a distribution center, which in turn replenishes its inventory by ordering in lots from factories. DRP is simply the term given to MRP when it is used to properly time-phase these dependent demands on finished goods inventory and plan production at the manufacturing facility to include the distribution system.

DISTRIBUTION RESOURCE PLANNING (DRP II) — Just as MRP was extended into areas other than material requirements planning, so was DRP. DRP II includes planning cubage for traffic requirements, converting the distribution requirements plan into dollars, using it for planning manpower requirements at warehouses and so on.

ECONOMIC ORDER QUANTITY (EOQ) — The mathematical computation for finding the least total cost lot size. The EOQ formula solves for the lot size where ordering cost and inventory carrying cost are equal.

EXPEDITING — Trying to get jobs rushed through to cover shortages or to meet shipping requirements. Expediting is a bad word in most companies because the entire system has often degenerated into an expediting system. The expeditor typically finds out too late what material is needed and thus is chronically causing disruptions in factory schedules and in purchasing.

EXPLOSION — An extension of an assembly or subassembly bill of materials into the total of each of the components required to manufacture a given quantity of the assembly or subassembly.

FINISHED GOODS INVENTORY — Product that is ready for shipment and is carried in inventory in anticipation of customer orders.

FINITE LOADING — Conceptually, the term means putting no more work into a factory than the factory can be expected to execute. This is a function of master scheduling. The specific term usually refers to a computer technique that involves automatic shop priority revision in order to level load operation by operation. Finite loading requires that the arrival of jobs at each operation be predicted very accurately and also assumes the computer can be accountable for the shop schedule and people don't have to.

FIRM PLANNED ORDER — In material requirements planning, a planned order explodes material requirements to lower levels and is rescheduled automatically. A scheduled receipt (released order), on the other hand, does not explode material requirements since it is assumed that material was available when the order was issued (unless a back order for a particular component had to be created) and is not rescheduled automatically. Since the planned order at any level generates the requirements at the lower levels, the firm planned order really acts as a master schedule. Good MRP requires that the master schedule be controlled very carefully to represent what is actually going to be done. Therefore, the firm planned order is a planned order that can be frozen in quantity and time so that it does not change without human intervention.

GROSS REQUIREMENTS — Material requirements that have not been reduced ("netted") by deducting the on-hand and on-order quantities.

INDENTED BILL OF MATERIALS — A bill of materials that is printed with the level "0" items usually shown in the left-most column, level-on components indented one column to the right and so on.

INDEPENDENT DEMAND — Demand for an inventory item is considered independent when it is unrelated to any higher level that the company manufactures or stocks. The demand for a service part that is shipped directly to customers would be considered independent. However, if that service part were shipped to a branch warehouse, the demand on the ser-

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vice part would be a function of branch warehouse replenishment and would be considered dependent. Generally, independent demand items are those that are carried in finished goods inventories.

INFINITE LOADING — Showing the work behind work centers in the time periods required regardless of the capacity available to perform this work. The term infinite loading is considered to be obsolete today, although the specific computer programs used to do infinite loading, when they take into account planned orders as well as released orders, can be used to perform the function now called capacity requirements planning.

INPUT/OUTPUT CONTROL — A simple technique for capacity control where actual output is compared with planned output developed by capacity requirements planning. The input to a work center can be monitored to see if it corresponds with plans so that work centers will not be expected to generate output when material is not available.

INVENTORY CONTROL — A rather nebulous term sometimes used to refer to inventory accounting and sometimes used to describe order point-based replenishment systems as distinguished from MRP systems. Properly used, it means having the right material in inventory to meet needs. In an MRP-based system, inventory control is a by-product of priority planning.

INVENTORY MANAGEMENT — Another term for inventory control and also rather nebulous. When order point and economic order quantity were assumed to be the techniques for controlling inventory, inventory management was used as a term to describe the use of these techniques to achieve an "optimum" level of inventory.

ITEM MASTER RECORD — A computer term for the inventory record.

LEAD TIME — The time it takes to replenish an item in inventory. The overall lead time starts from the moment it is determined that the item needs to be replenished until the time it is determined that it is back in inventory and once more available.

LEAD TIME OFFSET — Time-phased MRP shows planned orders in their proper release time period — the lead time "offset" — based on the lead time.

LEVELS — A bill of material must be properly structured to represent the way the product is made. In the U.S., the final product is called the "0" level. The subassemblies that go into the final assembly are at level 1, their components are at level 2 and so on.

LOADING — Measuring the backlog or "load" behind work centers. Loading has been superseded by capacity requirements planning, which puts the emphasis on forecasting capacity requirements rather than just adding up backlog.

MANUFACTURING RESOURCE PLANNING — Material requirements planning evolved into the closed-loop MRP system, which then evolved into manufacturing resource planning, a system that includes the financial planning as well as planning in units. MRP becomes the basis for the financial system.

MASTER PRODUCTION SCHEDULE — The build schedule, stated in bill of material (or bill of material module) numbers, that drives the MRP and, consequently, the capacity planning systems.

MATERIALS MANAGEMENT — This is an organizational concept that involves putting all of the functions concerned with the movement of materials — production control, inventory control, traffic, stores, materials handling, purchasing and so on — under one manager. The rationale is that this avoids conflicts among groups with different objectives.

MATERIAL REQUIREMENTS PLANNING — Computers were used shortly after their introduction into manufacturing companies to explode material requirements or do "require-

ments generation." With the introduction of time phasing, these material requirements could be expressed in detail in specific time periods, usually weeks. By this time, netting out gross requirements against on-hand and in-process inventory had become well-accepted technology. Modern MRP, therefore, is an approach for calculating material requirements not only to generate replenishment orders, but also to reschedule open orders to meet changing requirements.

MODULAR BILL OF MATERIAL — A bill of material used for master scheduling that expresses the material requirements for a product without showing the final configuration of the product. Modular bills of material for an automobile, for example, would list such things as engines, transmissions, body styles and upholstery options, rather than attempting to show the final configuration of a specific automobile. Modular bills of material are particularly useful for material requirements planning where the final configuration of the production is extremely difficult to forecast.

NET CHANGE MRP — Material requirements planning on a true exception basis. The net change concept specifies that a partial explosion will be triggered by a change in inventory, requirements, open order or product structure status. The net change system is a transaction-driven system. While theoretically the net change system would be a continuous processing type of system, in practice net change is usually done in daily batch mode. See also Requirements Alteration.

NETTING — Deducting gross requirements from the amount on hand and on order in order to generate the material needs or net requirements.

OFFSET — See Lead Time Offset.

OPERATIONS SCHEDULING — Putting the dates on the individual operations on a routing to show when each operation needs to be completed to achieve the schedule.

ORDER POINT — A quantity established for reordering purposes. When the total stock on hand plus on order falls below the order point, a new supply is ordered. The order point is computed by extending the estimated demand over the replenishment lead time and adding a safety stock to account for forecast error.

PEGGING — Showing what items at higher levels caused specific requirements in an MRP output report.

PHYSICAL INVENTORY — A count of actual inventory on hand in order to reconcile it to the book figures. Usually this is done annually for auditing purposes to be sure the financial records accurately reflect the assets of the company.

PLANNING BILL OF MATERIAL — This is a bill of material used in the master schedule to plan requirements before actual customer orders have been received. It will typically show the percentage of various options that are normally required.

PLANNING DEPARTMENT — In an MRP II system, the group that plans material and capacity and converts this information into dollars.

PLANNING HORIZON — The time into the future that the master schedule and material requirements planning system looks forward. The planning horizon might be one or two years or other, depending upon the lead times down through the product structure and any additional time required for capacity planning beyond the material lead times.

PLANNED ORDER RELEASE — In a time-phased MRP system, "gross requirements" are deducted from the inventory on hand and on order (scheduled receipts) to project an available balance. When requirements exceed the amount on hand and on order, a negative balance or net requirement results. The net requirements is converted to a lot size if necessary and is then offset by the lead time to create a planned order release. Planned orders at

one level in the product structure become gross requirements at the lower level.

PRIORITY PLANNING — When MRP was first developed, it was considered to be an ordering system. Then it became recognized that it could also handle rescheduling. Today, we recognize that the most serious deficiency we faced before the computer was available was the inability to schedule properly. This was because the inventory system launched orders while the production control system consisted primarily of expediting. As MRP saw more and more use in practice, it became evident that the real power of the technique was its ability not only to order material at the right time and to establish the correct due dates on the shop and purchase orders when they were issued, but also to keep these dates correct and in line with the latest requirements. The term priority planning was coined to describe this function.

PRODUCTION CONTROL — The old term used for the department that was responsible for "scheduling." See Planning Department.

PRODUCTION PLAN — Setting the level of manufacturing operations, usually by product group or in some other broad terms. Production plans are established in units, dollars or hours.

PRODUCT STRUCTURE — The way materials go into the product during its manufacture. A typical product structure would show raw material being converted into fabricated components, components being put together to make subassemblies, subassemblies going into assemblies and so on.

PROJECTED AVAILABLE BALANCE — In an MRP output report, the amount on hand is projected into the future by deducting each period's requirements and adding scheduled receipts.

PURCHASE COMMITMENT REPORT — Projection of the dollars committed to vendors, based on costing out the open purchase orders by time period.

PURCHASE ORDER — An order going to a vendor authorizing the vendor to deliver one or more items.

PURCHASE RECOGNITION — A document usually generated by production and/or inventory control personnel authorizing the purchasing department to issue a purchase order for material.

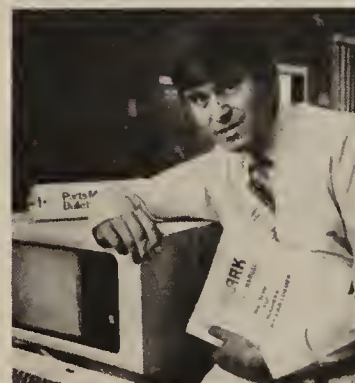
REGENERATION — A form of MRP where the entire master schedule is periodically reexploded down through the bills of material, usually once a week, and netted out against on-hand and on-order inventory to determine what net requirements are. At the same time, open orders that are out of phase with requirements are noted so they can be considered for rescheduling. Compare with Net Change.

REQUIREMENTS ALTERATION — Another exception-type approach to MRP where a change in requirements at any level of the product structure will trigger a partial explosion to lower levels. Note that requirements alteration, unlike net change, is not truly transaction driven. A change in the product structure, a scrap ticket affecting the quantity on an open order or an inventory discrepancy would

(Continued on In Depth/12)

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IN DEPTH

(Continued from In Depth/9)

computer so that each morning the foreman can have an up-to-date schedule that is driven by MRP. If part 80021 had been rescheduled to a new completion date as discussed above, its priority would drop on the dispatch list. This would allow another part to be made earlier.

The dispatch list gives the foreman the priority of jobs so they can pick the proper job to start next. Because the dispatch list is driven by MRP, it tells the foremen the right sequence in which to run the jobs to do the best job of preventing predicted shortages.

There are specific reports to go with each of the major functions in the closed-loop system shown in Figure 2. They are:

1. Business Planning:

The business plan in dollars.

2. Production Planning:

The production plans in units.

3. Master Production Scheduling:

The master production for individual items in a make-to order business or groups of components and components in a make-to-stock business.

4. Material Requirements Planning:

The material requirements plan.

5. Capacity Requirements Planning:

The capacity requirements plan.

6. Executing Capacity Plans:

The output control report.

7. Executing Material Plans:

The shop dispatch list and vendor schedule.

It is important to emphasize the feedback function in a closed-loop system. If vendors, for example, are not going to ship on time, they must end in an anticipated delay report as soon as they know they have a problem. In the past, ship dates were not valid. The typical company had plenty of past-due purchase orders with the vendor.

With MRP, if it is properly managed, dates will represent real need dates, and therefore it is important to feed back information as quickly as possible to indicate when these dates cannot be met. This, of course, is also true for the factory where the anticipated delay report should be a regular part of their feedback to the closed-loop system.

A closed-loop MRP system is a fairly modern development. Many companies talked about material requirements planning for years and did explode bills of material on a computer. But it was the advent of the modern computer with its great processing speeds and storage capabilities that made modern MRP practi-

cal. The ability to break down requirements into weekly or even daily time periods rather than showing them in monthly increments, for example, helped MRP to become a scheduling system rather than just another — even though quite superior to order point — order launching. The ability to plan requirements weekly — or even daily — made MRP a practical scheduling tool. Before 1971 it would be hard to find any closed-loop MRP system in existence. Master production scheduling was badly understood. Capacity planning and dispatching were tried, but were usually ineffective because the priority planning was not valid. Computers of that time could not keep schedules up to date, and the people using them did not understand how to master schedule properly to do so. Closed-loop MRP is truly a product of the computer age.

Many data processing/systems people find communications with manufacturing types extremely frustrating. Having spent 14 years on the factory floor and visited more than 1,300 manufacturing companies, I can well understand that frustration. But let's look at the manufacturing person's attitude based on experience. Here are the things that turn manufacturing people off:

- Computers.
- Complication.
- The need for accurate data.
- Education.
- Data processing jargon.

Rare is the company that has not had a bad experience in manufacturing with a computer system. The manufacturing people were told the wonderful system was going to be the answer to all their problems. When it was installed, it not only didn't solve their problems, it added complication and frustration to their lives. As a consequence of this and things they've heard from other manufacturing people about computer fiascos, manufacturing people are extremely wary of anything that has to do with the computer.

There's an old saying, "A man would rather live with a problem he can't solve than accept a solution he can't understand." Most systems designers have the computer virus. They tend to be complicators. They want to introduce all kinds of fancy techniques like exponential smoothing, critical ratio and part-period balancing because they have great faith that somehow these techniques will generate superior results. Unfortunately, nothing will generate superior results if people don't understand it. A manufacturing man will not accept a system that is too complicated to explain to his supervisors in 15 minutes.

In the world of the shortage list, accurate data means nothing. Go to the typical foreman and ask: "Isn't it important to have accurate inventory records?" To him, accurate inventory records are something the account

Glossary

(Continued from In Depth/11)

not trigger a partial explosion in a requirements alteration system, but would trigger a partial explosion in a net change.

ROUTING — A specification of the sequence of operations required to manufacture a product.

SAFETY STOCK — Stock replenishment systems are based on estimates of demand over lead time. Since demand in any particular lead time could exceed the estimates, extra inventory — "safety stock" — is planned into the order point.

SAFETY TIME — A safety stock specifically expressed in terms of time (for example, two weeks). This is much preferable to establishing the safety stock as a quantity, particularly for items with sporadic use.

SCHEDULED RECEIPT — An open shop or purchase order in an MRP output format.

SCHEDULING — Establishing the timing for performing a task. There are various levels of scheduling within a manufacturing company.

SEMIFINISHED INVENTORY — Inventory that is stored before some final operations that will convert it to different products.

SHOP ORDER — An order going to the factory authorizing manufacture of an item.

SHORTAGE LIST — The list of material missing when the required material is staged.

STAGING — When the formal priority planning system did not work, expeditors pulled material from the stockroom to see which ones were missing to make the products on the master schedule. An expensive, confusing, obsolete practice.

TIME-PHASED ORDER POINT — Material requirements planning for independent demand items where the independent forecast, rather than higher level requirements, is put into the time periods.

TIME PHASING — A term frequently used as a synonym for MRP. Modern MRP systems are time phased into weekly — or smaller — time periods by definition, thus the term is obsolete. Strictly speaking, it refers to the practice of showing requirements, scheduled receipts, the projected available balance and planned order releases in their proper time relationship to each other.

TURNOVER RATE — A performance measure that is most meaningful within a company rather than between companies. The turnover rate is calculated by dividing the inventory investment into the annual cost of sales to see how many times the inventory "turns over" during the year.

VENDOR SCHEDULE — Vendor schedule is being used in place of the purchase order in modern MRP II systems. The purchase order was a contract with a schedule in it. The contract usually did not have to be changed more than once a year. The schedule should be reviewed at least once a week. Consequently, modern MRP II systems use a "letter of agreement," which is really a contract between the vendor and the customer, and a separate vendor schedule that usually goes out once a week to show the updated need dates for material.

WHERE-USED LIST — An inverted bill of material that shows where each component is used at its higher level.

WORK CENTER — A group of machines, workstations or people who can perform similar operations. A number of presses of the same capacity that can take the same dies could be considered to be within one work center for capacity planning purposes.

These definitions were taken from the forthcoming book, *MRP-II: Manufacturing Resource Planning*, to be published by Oliver Wight Limited Publications, Williston, Vt.

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Every type of computer and peripheral — mini/micros, disk drives, tape drives, printers, interfaces, CRTs — will be on display at the Invitational Computer Conferences, the only one-day regional seminar displays directed exclusively to the needs of the quantity buyer. During the 1980-1981 series, over 7,000 OEMs attended the conferences to receive a concentrated, close-up view of the newest computer and peripheral equipment presented by forty of the world's top manufacturers, as well as to attend a program of technical seminars covering the latest state-of-the-art technology.

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Date	Location
Sept. 11, 1981	Newton, MA
Oct. 1, 1981	Minneapolis, MN
Oct. 27, 1981	Valley Forge, PA
Oct. 29, 1981	Washington, D.C.
Nov. 17, 1981	Palo Alto, CA
Jan. 11, 1982	Orange County, CA
Feb. 10, 1982	Ft. Lauderdale, FLA
March 23, 1982	Dallas, TX
March 25, 1982	Houston, TX
April 11, 1982	Southfield, MI



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ing people are concerned about. They have nothing to do with getting shipments out the door. That's a case of finding the shortages and expediting energetically to get the job done.

Since manufacturing management has not been a real profession, there has not been a great deal of formal education. There are no courses at the college level on how to run a manufacturing business. Courses deal with marketing, finance and industrial engineering; but none tries to pull the whole scope of managing a manufacturing business together.

To the manufacturing man, education is going to a seminar where you hear a bunch of speakers give talks that are totally uncoordinated. Some speakers are DP salesmen, some are software salesmen, some are consultants and once in a while there is a user telling about how his company installed a better system for making donuts, which happens to be their product. The idea that manufacturing is a profession, that manufacturing people have to be educated, that moving from the world of the shortage list to a formal system like MRP requires education, not only is foreign to the manufacturing person; it sometimes is taken as an insult.

Nothing is more annoying to manufacturing people than acronyms, three-letter words and DP jargon. These form a convenient shorthand for people who are in the field, but should be avoided when talking to manufacturing people. It makes them feel left out, talked down to and that the DP people are a bunch of technicians posing as magicians.

Here are the things that turn manufacturing people on:

- Shipments.
- Eliminating shortages.
- Productivity.
- Simplicity.
- People.

A general manager of a hotel once said, "A hotel without people in it is just a pile of bricks." So is a manufacturing company without shipments going out the door. Shipments generate the profits and keep the business going, which is how the manufacturing people are typically measured. If shipments don't go out at the budgeted rate, profits will not be generated at the budgeted rate.

In the typical manufacturing company, 30% to 40% of the shipments normally go out in the last week of the month because they are expediting for the first three weeks and producing in the last week. This is known as the end-of-the-month push. It creates all kinds of havoc and is a nerve-racking experience. However, it's the way things had to be done in the world of the shortage list. Anything that can help provide a steadier flow of material to even out the flow of shipments is appealing to most manufacturing people.

Manufacturing people have lived with the frustration of shortages since manufacturing began. They

know they find out about shortages too late and anything that can show them earlier what the shortages are likely to be has a great appeal.

Manufacturing people recognize that material shortages hobble productivity in an assembly department. They also recognize that breaking into setups (when a machine is making a particular part, but in order to fix the shortage it is switched over to another part before the entire lot of the first part has been run) interferes with productivity.

Manufacturing people are not in the business of writing papers for the *Operations Research Journal*. They want simple tools that can help them to do their jobs — the simpler, the better. And MRP can be explained to them in a very simple way: "You know what a shortage list is. You know you find out about the shortages too late. MRP uses the same logic as the shortage list in a formal system to predict the shortages well in advance, typically a year or two. It predicts them over and over, at least weekly, often daily. This enables you to work on next month's shortage at the beginning of this month, rather than finding out about it at the end of next month. Certainly that makes sense."

Tell them about data integrity, and keep it simple: "Obviously, if we're going to use a computer to predict shortages ahead of time, we're going to have to have correct numbers — correct numbers that the shortage list simply didn't require. The on-hand inventory balance in the stockroom will have to be correct. That's why we have limited access to the stockroom now and have made the stockroom people accountable for making sure transactions occur as material goes in and out of stock.

"The material in that stockroom doesn't really belong to the stockroom people; they can't do anything with it. It belongs to the manufacturing people, just as the money in the bank belongs to the depositors, not the bank. But the stockroom people have now become your bankers, and they will be responsible for inventory record integrity with your help.

"It's up to you to make sure your people understand why material cannot be taken from the stockroom without the proper paperwork and why unauthorized people will not be allowed in the stockroom. The problem is not with bad guys stealing material. The problem is with good guys who are trying to get production out the door, who take material without the proper paperwork, and thus cause next month's shortages because the inventory records are incorrect and cannot be used to do the proper planning."

Anyone who's worked in manufacturing knows a system is not going to fix anything. It is just going to give people the information to do the job. If the system, for example, shows there is going to be a capacity problem in the future, there is nothing

the computer can do about this. Production control and manufacturing supervision will have to come up with an answer to the problem. That answer could be running the work on an *alternate routing* (A job might be planned to go across a new machine tool that already has so much work ahead of it that this job can't possibly be run. Therefore, it would be run typically on some other general-purpose machine tools), or the work could be subcontracted, or the shop could work overtime, or, if all else fails, the master schedule might have to be changed.

But people are going to have to do this; the computer won't. Unfortunately, most systems people convey the idea that they look with disdain upon the manufacturing supervision. These people have worked many years in the factory. They know many things not included in the data base. Because they busted their tails to make it happen, they have kept the shipments going out the door when the only tool they had was a shortage list. If they don't put that same effort into preventing the shortages, MRP is not going to be a successful system.

Very few companies that install

MRP even bother to educate their foremen and supervisors, much less their machine operators. MRP is a more professional way to run a manufacturing business and it requires that everybody in a manufacturing company be educated. In particular, attention should be paid to first-line supervision: the people who make the schedules actually happen.

Probably the toughest idea to sell is that of convincing manufacturing people that education is a requirement for operating a manufacturing business more professionally — and it has to be sold. The best way to sell it is to have the manufacturing people and their managers attend an education program.

Making MRP Work

Much has been said about MRP having a very spotty track record. Even I have contributed to this misconception by saying that there are probably not more than 50 Class A MRP users in the country. A Class A MRP user is one that uses it as a whole company system and is able to operate without a shortage list. A Class B user is one that uses MRP as a closed-loop system, but doesn't man-

(Continued on In Depth/14)

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(Continued from In Depth/13) age its master schedule well enough to do without a shortage list and uses MRP primarily as a better production and inventory control system. A Class C user uses MRP as a better inventory control system, and a Class D user runs MRP in the DP department without any particular results any place else.

Nevertheless, a company does not have to be Class A to get results from MRP. There are probably more than 200 Class B users in the U.S. today and they are getting substantial improvements. *Business Week* quoted a survey, "The Trick of Material Requirements Planning" (June 4, 1979), that included 326 companies. The typical company improved inventory turns by one-third, im-

proved delivery performance 17% and reduced lead time by 10%. To say that companies don't get results from MRP is in direct contradiction to the facts.

But when you see the way the typical company approaches MRP, it's amazing they do get results! Here is a checklist, broken down into four areas, to aid in installing MRP successfully.

Systems

- *The system should be a standard MRP system.* Too many users think their businesses are unique. They do not recognize that every manufacturing business has to have a production plan, a master production schedule, usually some kind of material requirements planning, capacity planning and so on.

Some businesses, foundries, for example, may have less concern about material requirements planning than a company making an assembled product, but the fundamental manufacturing equation applies to every business. A standard system is the only system that will work. This could mean standard software purchased from a hardware or software supplier, or it could mean a program written by a company but using standard logic. Manufacturing Software Systems of Williston, Vt., supplies information on what constitutes a "standard" MRP system as well as reviews of the most popular software packages comparing them with this standard.

- *The system must be simple.* Fancy techniques do nothing

but turn off the users. If the system is not simple and understandable, the user will either obey it blindly or ignore it completely. You cannot have accountability without understanding; and you cannot have understanding without simplicity.

- *The system should be approached as if it were a business project.* Too many companies take too long installing MRP because they suffer from "paralysis through analysis."

Data

- *Inventory record accuracy must be very high.* Given some reasonable tolerances for different categories of inventory, inventory record accuracy should be in the 95% range to support an MRP system.

- *Bills of material must be not only correct, but they must also represent the way the product is really built.* The engineers may simply show a parts list, but the bill of material has to simulate the shortage lists and, therefore, must represent the way the product is really built.

- *Routings have to show the correct operations sequences, or the capacity planning and dispatching will not be correct.*

- *The master production schedule must represent what is actually going to be produced or the priorities will not be correct.*

People

- *MRP requires massive education.* Some people should attend live classes; others will have to be taught by means of video courses. Oliver Wight Video Publications, Inc., Williston, Vt., supplies a video library to educate people in all aspects of MRP.

- *In particular, top management must be educated.* Any company that cannot get its top management to attend an education program (not a "seminar" with a potpourri of speakers) should not proceed with MRP.

- *First-line supervision should be educated.* This was discussed previously.

- *Enthusiasm is a must.* Too many people think of education as a fact transfer, and there is no question that there are facts to be conveyed from the instructor to the user. But there has never been a successful MRP system without enthusiastic leadership and enthusiastic people.

You don't hire a bunch of outside people to install MRP. This means everyone

has to work hard during the installation because they still have to keep the shipments going out the door.

- *There should be a project plan to indicate, step by step, what has to be done to install MRP.* Names should be assigned to each step, and the chief executive officer's name should be at the top. In the final analysis, if MRP is just a waste of money, it is he who will take the brunt of the blame.

- *There should be a full-time project leader.* This should not be an outsider, nor should it be a systems person. It should be an experienced company person who has a high level of credibility with people in the company because, in the final analysis, the real problem is people. It is far easier to teach MRP to a company person than it is to teach the product, the processes and the people in a company to an MRP expert. This project leader should be a heavyweight, certainly not at a lower level in the company than materials manager.

- *There must be line accountability for success.* The general manager should hold the manufacturing vice-president accountable; he should hold the plant manager accountable; and he should hold the project manager accountable for making MRP work.

Look at the success rate of MRP. Then look at the checklist and see how many companies have done it the right way, as opposed to the vast number of companies that have attacked MRP not as a way to run a manufacturing business more professionally, but as a DP system.

The real miracle is that MRP has worked as well as it has; there is no greater testimony to its fundamental soundness.

About the Author

Oliver W. Wight is president of Oliver Wight, Inc., a Newbury, N.H.-based firm specializing in management counseling and education in MRP II. A well-known author on production and inventory management, his latest book on MRP II will be released in late 1981.

Wight was formerly manufacturing industry education manager for IBM, where he was responsible for the content of all IBM internal training and customer executive courses on manufacturing applications of the computer.

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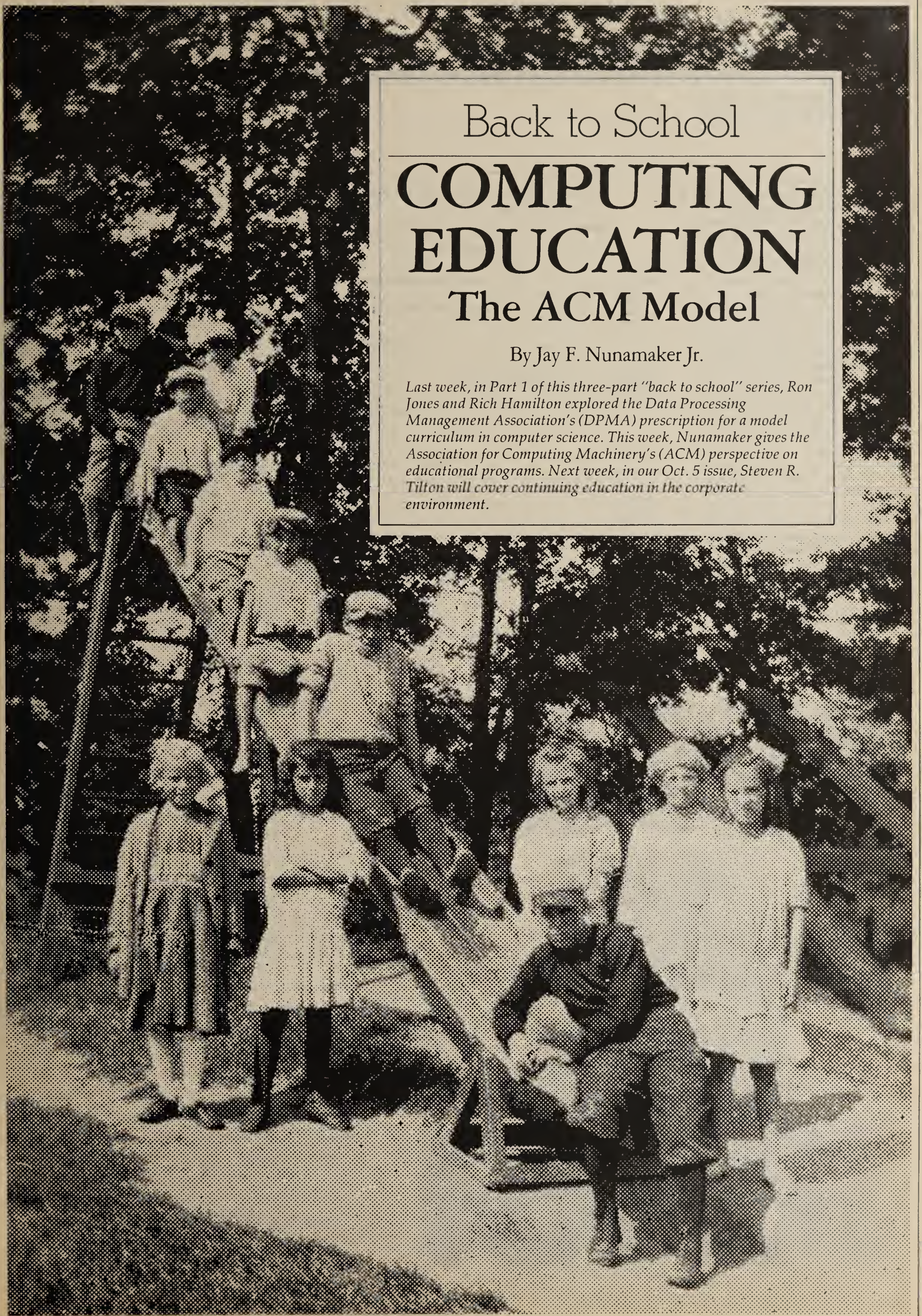
Back to School

COMPUTING EDUCATION

The ACM Model

By Jay F. Nunamaker Jr.

Last week, in Part 1 of this three-part "back to school" series, Ron Jones and Rich Hamilton explored the Data Processing Management Association's (DPMA) prescription for a model curriculum in computer science. This week, Nunamaker gives the Association for Computing Machinery's (ACM) perspective on educational programs. Next week, in our Oct. 5 issue, Steven R. Tilton will cover continuing education in the corporate environment.



IN DEPTH

It is generally agreed in the computer industry that there is a shortage of trained personnel across all occupational categories. Studies assessing the shortage of trained personnel needed for effective use of computer technology are not always quantitatively consistent, but all agree the shortage is acute.

The experience of the Association for Computing Machinery (ACM) Curriculum Committee on Information Systems suggests the shortage is not uniform across the technical/organizational spectrum. Demand for personnel with a combination of technical and organizational skills is relatively much greater than demand for solely technical skills (Figure 1).

Computer-related occupations range from those requiring heavy technical skills in computer hardware and software and almost no organizational skills to only modest computer hardware and software knowledge. In the area of programming, systems programming requires a great deal of technical knowledge, while applications programming requires a mix of both technical and organizational skills.

In systems analysis and design, the physical system design task of con-

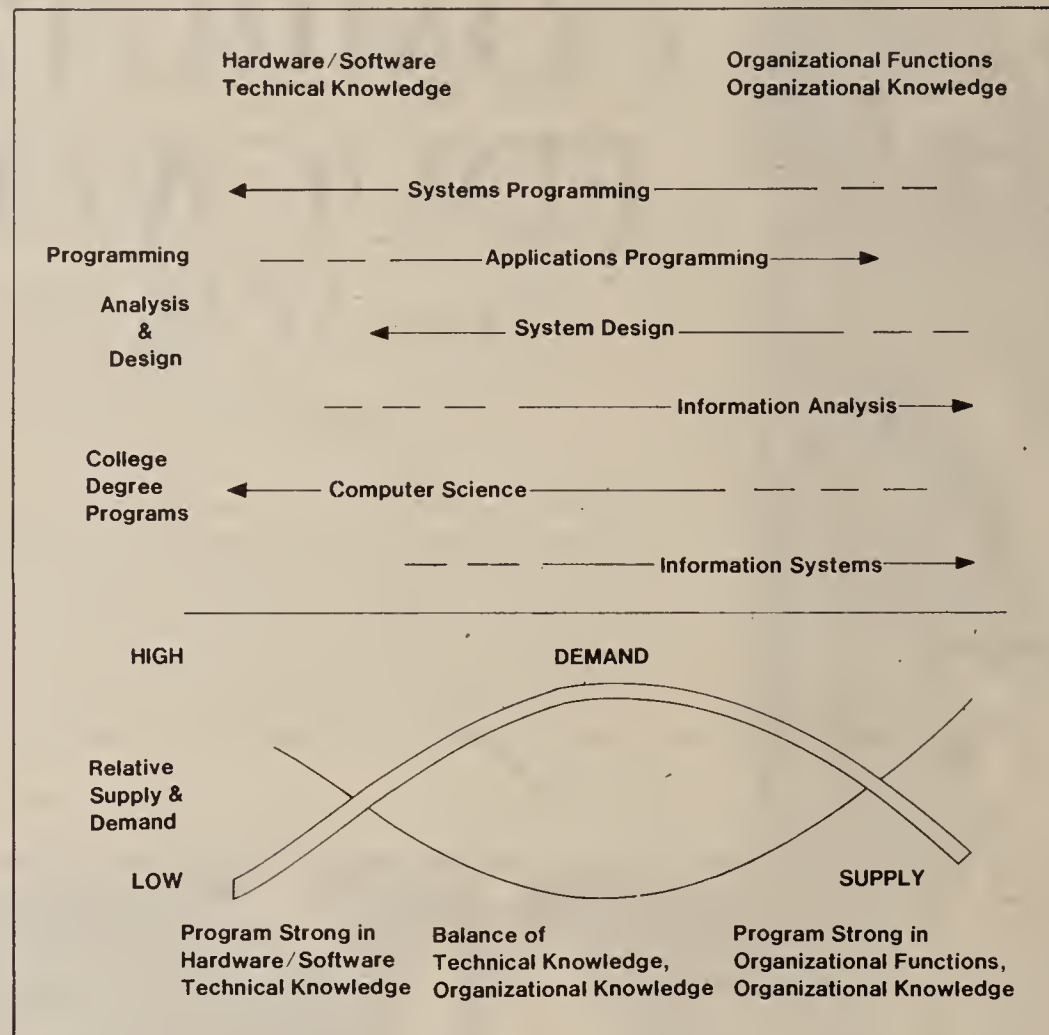


Figure 1

figuring hardware and software requires extensive understanding of hardware and software information analysis, a moderate level of technical expertise and thorough knowledge of organizational functions and processes and of human behavior in systems and organizations.

A hidden but significant impact of the imbalance of supply and demand is that people trained toward the technical end of the spectrum are drawn into positions toward the organizational end. This mismatch creates problems in the analysis and design of information systems and makes it appear the shortage of trained personnel is uniform across the entire discipline. In fact, it is not.

Just as programs stressing strong technical and weak organizational skills provide inadequate background for analysis and design, programs training for strong organizational and weak technical skills leave students poorly prepared to handle complexities of systems analysis, design and implementation.

The need, then, is for a degree program that provides both technical and organizational knowledge. Operationally, this means the information systems curriculum must in-

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clude subject matter from both the traditional disciplines of computer science and those of administration and management.

The use of computers in support of organizational processes such as data processing, decision support and information shortage and retrieval requires systems so designed and implemented that they:

- Identify information requirements (based on understanding organizational functions, organizational processes and decision making).
- Fit technical characteristics into the behavioral framework of the organization.
- Match technical design with human characteristics.

Computer science degree programs typically emphasize hardware and software technical knowledge and exclude organizational dimensions. Computer science curricula, then, serve occupations needing a technical emphasis (Figure 1). A need also exists for a program (information systems) to meet the other range of positions. The information systems curriculum has some subject matter contained in computer science, but also covers necessary organizational and behavioral knowledge.

The Association For Computing Machinery

The Association for Computing Machinery (ACM) was founded in 1947 as the society of the computing community. It is dedicated to developing information processing as a discipline and to responsible use of computers in an increasing diversity of applications.

Its purposes are:

- To advance the sciences and arts of information processing, including, but not restricted to, the study, design, development, construction and application of modern machinery, computing techniques and appropriate languages for general information processing; scientific computation; the recognition, storage, retrieval and processing of data of all kinds; and the automatic control and simulation of processes.

- To promote free interchange of information about the sciences and arts of information processing both among specialists and among

the public.

- To develop and maintain the integrity and competence of individuals engaged in the practice of information processing.

Methods for achieving these purposes include formation of chapters and special interest groups; holding meetings for presentation and discussion of papers; and the publication of journals, books and other materials.

The ACM holds its annual conference this year at the Bonaventure Hotel, Los Angeles, Nov. 9-11. The organization publishes a monthly journal, *Communications of the ACM*. One special interest group is Siggraph, which explores the area of computer graphics and hosts an annual convention.

Membership is \$40 annually through ACM, P.O. Box 12114, Church St. Station, New York, N.Y. 10249.

Not only is demand not uniform across the technical/organizational dimension, but academic programs supplying trained personnel are radically out of balance with demand.

Survey of Programs

To assess the status of information systems courses at the B.S., M.S. and Ph.D. levels, from June 1977 to June 1979 the Curriculum Committee surveyed schools of business administration, departments of computer science, engineering colleges and academic units offering such courses. A one-page description of each program was then generated according to a standard format. This standardized description was used as a guide to summarize information about each program.

The results of the survey include a listing of the most common names for information systems programs and an evaluation of the number of programs that met the guidelines established by the ACM Curriculum Committee on Computer Education for Management in 1972 and 1973. The survey results were used to revise early ACM curriculum efforts. The ACM curriculum recommenda-

(Continued on In Depth/20)

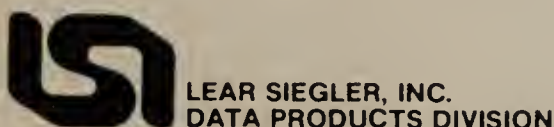
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I-9040



I-9020

IN DEPTH

(Continued from In Depth/17) tions are based on earlier work of the ACM Curriculum Committee on Computer Education for Management and the ACM Curriculum Committee on Computer Science (See References, 1 through 8).

First Step

The first step of the survey project was to collect college

and university catalogs, brochures and general descriptions of information systems programs including current program requirements and course offerings. Letters requesting this information on undergraduate and graduate levels were sent to 205 business schools meeting American Assembly of Collegiate Schools of Business (AACSB) accreditation standards, 149

computer science department heads and 159 collegiate chapters of ACM.

From a review of the materials, it was determined that 101 schools offered some form of information systems course study. The 101 colleges and universities offered 81 programs at the bachelor's level and 29 programs at the master's level. Many institutions offered

both an undergraduate and a graduate program.

Common Names

In the list of reported information systems programs, 39 different names were associated with the field. The two most common, by far, were "management information systems" and "information systems."

The results indicated only

58 undergraduate and 39 graduate programs satisfied minimum criteria for classification as information systems programs based on the ACM curriculum. The colleges of business or management were found to be the home for a majority of information systems programs. Of 58 bachelor's programs, 47 were offered by business or management colleges. Of 39 master's degrees, 30 were offered at these colleges, as opposed to nine at computer science departments of engineering colleges.

The 28 doctoral programs were not evaluated with respect to minimum criteria since most programs can be customized to the interests of the individual student.

After the curriculum committee completed the survey of information systems programs in 1979, it started the process of discussing a revised curriculum with representatives of business, government and educational institutions. Many people assisted the group in its work.

Initial Meeting

An initial meeting was held in New Orleans in November 1979. The group from the New Orleans meeting was divided into three subgroups to work on detailed course outlines. In July 1980, the subgroups held meetings in Atlanta, Dallas and Colorado Springs, Colo. The results of the subgroups were presented at a workshop held in Tucson in November 1980. The results of the Tucson workshop were discussed with representatives of both business and government at a meeting in Dallas last March.

Committee members during the preparation of the ACM recommendations were J.F. Nunamaker, chairman, University of Arizona; J.D. Couger, University of Colorado; William Cotter-

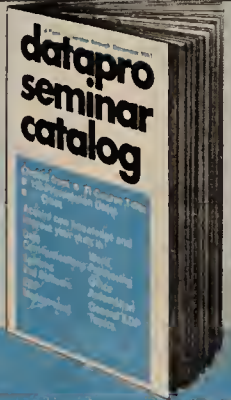
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G-6	Using Computer Graphics: Techniques, Systems and Applications	11/30-12/2	11/16-18	11/4-6	10/19-21					
G-7	Effective Oral Presentation Techniques for DP Professionals	9/21-23	10/19-21	10/26-28	11/16-18					
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man, Georgia State University; Gordon B. Davis, University of Minnesota; Benjamin Diamant, IBM; Andrew Whinston, Purdue University; and Marshall Yovits, Indiana-Purdue University at Indianapolis.

Curriculum Goals

In order for the information systems community to face the demands of the future, the new curriculum must address the basic goals of people needs, skill needs and tool needs.

The people needs are clear: More individuals should be exposed to the fundamental training necessary to operate in an information systems environment. The information function is a fundamental resource of the organization. People must be able to act intelligently as system users and builders. Information systems principles are as basic to the operation of current and future business organizations as economic and other business principles were in the past.

The complexity of our evolving information systems is increasing not only for the builders of information systems, but for users. We need to address training to prepare managers to be qualified knowledgeable users.

Concepts of multifunctionality and data and resource sharing are becoming increasingly important. The skill requirements in addressing the complex problems facing the public and private sectors are also growing. The curriculum must address these new skill demands and prepare the information systems student for new involvements in the organization.

The major changes since the 1972³ and 1974⁴ reports focus on:

- *Integration of management skills.* The communications, writing and behavioral skills have been integrated into the sequence of courses dealing with organizational concepts and concerns.

- *Recognition of data management and data communications courses.*

- *Recognition of AACSB requirements.*
- *Introduction of the MIS policy course as a capstone to the program.*

The policy course and projects course are to be taken in parallel. Either the policy or project course should focus on the total system or macroview and the other course should focus on a detailed study at the microlevel.

Curriculum Recommendations

The basic philosophy of the information systems program is that its graduates will be employed in positions involving organizational information systems. They will:

- Assist in defining and planning information systems.
- Elicit information requirements for applications and assist in designing the systems.
- Implement information systems applications.
- Manage information systems development and operation.

In their career paths, the graduates should not be limited to these four

functions, but should be qualified by their educational orientation to take positions both in functional areas and in general management.

Because of the organizational context of the work environment for the information systems graduate, the curriculum structure assumes an understanding of organizations, organizational processes and functions within organizations. The information system designer/implementer is a boundary spanner and a change

agent. The organizational knowledge should include an understanding of typical problems encountered by, and concepts, strategies and tools required of, such individuals.

Finally, organizational knowledge should also include interpersonal skills for communicating and human relations. In addition to support courses in communications, English and human relations, courses integrating these skills must be incorporated to prepare students to succeed

in the complex environment that is information systems.

The nature of the work to be performed by information systems graduates therefore establishes three major knowledge requirements:

1. Organizational knowledge and interpersonal skills.
2. Knowledge of information system analysis, design and development.
3. Knowledge of computer science

(Continued on In Depth/22)

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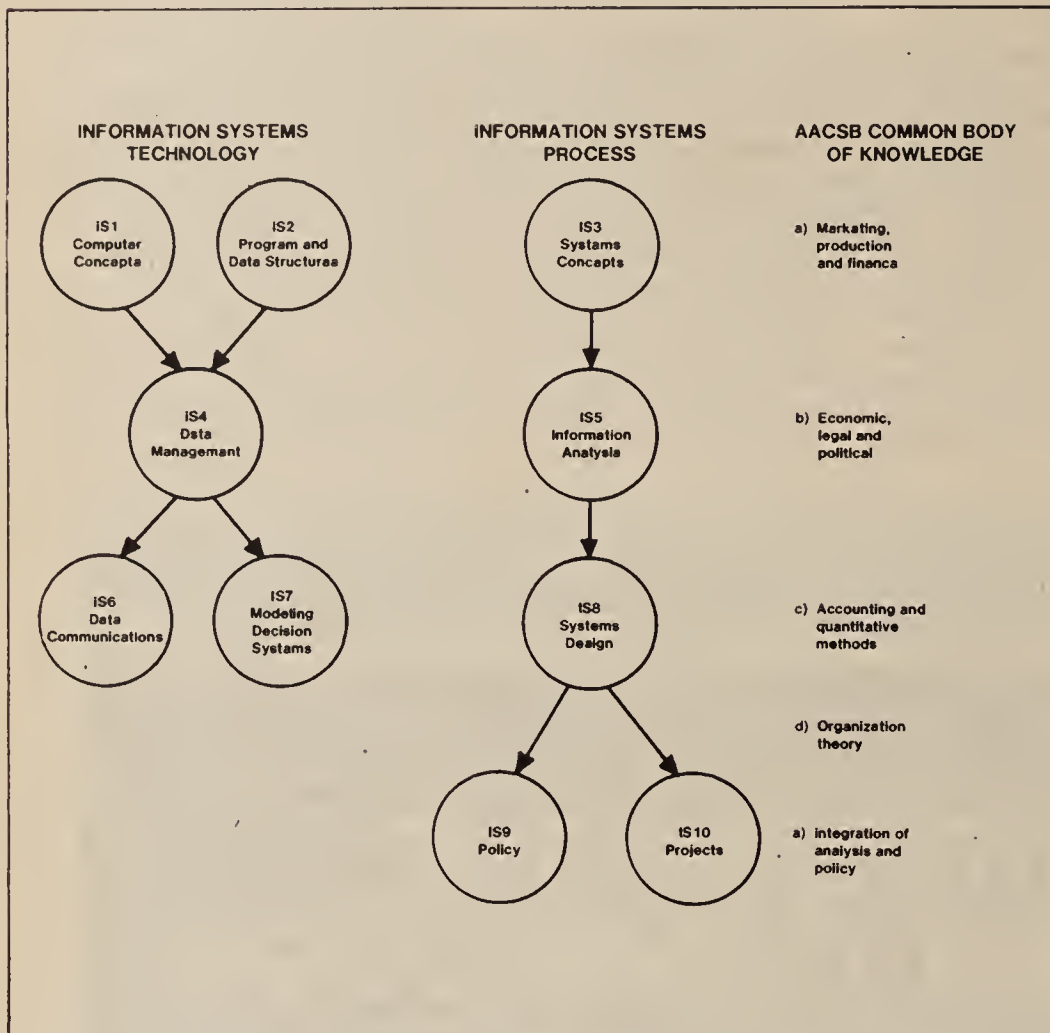


Figure 2. General Structure of the Information Systems Curriculum at the Undergraduate and Graduate Levels.

(Continued from In Depth/21)
hardware, system software and application software.

The information systems curriculum differs from a computer science

curriculum in the environment in which the program is taught, the employment environment for the graduate and the depth of technical expertise required:

1. The information systems curriculum is taught within two environments of organizational knowledge and technical computer knowledge, whereas computer sciences tend to be taught within an environment of mathematics, algorithms and engineering technology:

2. The information systems graduate is expected to work within the environment of an organization and to interact with the organizational functions as well as with the computer technology. The computer science graduate has less interaction with organizational functions and more interaction with hardware and software technology.

3. In technical expertise, the information systems curriculum places substantial emphasis on the ability to develop an information system structure for an organization and to design and implement applications. There is less emphasis on in-depth skills in hardware and software design. The computer science graduate typically has less exposure to information requirements analysis and organizational considerations, but obtains greater expertise in algorithm development, programming, system software and hardware.

Graduate Qualities

The graduate of a professional program in information systems should be equipped to function in an entry-level position and also have a basis

for continued career growth. He can gain the knowledge and abilities necessary to work effectively in this field by integrating concepts relating to people, models and systems for the application of computer technology in the context of organizations and society.

The entry-level positions for graduates, of course, depend on a variety of factors such as prior background and prior work experience. In general entry-level positions are:

1. *Systems analyst* (entry-level). This may be an information analyst working primarily with users to define information requirements or an analyst developing designs for information-system applications.

2. *Application programmer or programmer/analyst as on-the-job training to be a systems analyst*. Some organizations and some graduates feel it is desirable to gain some experience in applications programming prior to becoming a system analyst.

3. *Other information system functions*, such as in information system planning and administration.

Of course, formal educational processes are limited and some knowledge and experience must be obtained on the job, but much that is required of graduates can be taught. They are also testable in the academic environment — by written or oral examinations, by demonstrating successful operation of computer programs, through case discussions and

A Glimpse at the ACM

P1 — PREREQUISITE COMPUTER PROGRAMMING

Follows outline of CS1 Computer Programming I — Computer Science Curriculum 78.

Rationale: The intention of this course is to develop the skill and knowledge necessary to solve problems using a computer. This course develops a basic understanding of algorithm development, programming and computer concepts.

Objectives :

1. To introduce program solving methods and algorithm development.
2. To teach a high-level algorithmic programming language that is widely used.
3. To teach how to design, code, debug and document programs using techniques of good programming style.

P2 — PREREQUISITE QUANTITATIVE METHODS

Rationale: This course will develop skills for the student to recognize real-world problems that can be cast in the form of optimization models. The student should develop the skill necessary to characterize problems as scheduling problems, allocation problems, queuing problems, inventory problems and so on in order to use the appropriate solution technique, to understand the internal workings of mathematical programming software and to use intelligently the solutions produced by that software.

Objectives :

1. To introduce and exercise a range of analytical modeling techniques useful in decision-making in the system design environment.

2. To consider the function of such models as guides for data collection, structures for data manipulation and as systems for testing assumptions and generating a variety of alternatives.

3. To identify the problems of data collection, maintenance and accuracy when using models to assist decision-making activities.

IS1 — COMPUTER SYSTEMS CONCEPTS

Rationale: It is important for the student to possess a broad familiarity with fundamental concepts and terminology associated with computer hardware systems and operating systems.

Objectives :

1. To introduce computer architecture.
2. To introduce the major concept areas of operating systems principles.
3. To introduce the interrelationships between the operating system and the architecture.

IS2 — PROGRAM, DATA AND FILE STRUCTURES

P2 is a combination of CS2, Computer Programming, CS5, Introduction to File Processing, and CS14 Topic A, Software Design and Development — ACM CS Curriculum 78.

Rationale: Because of the emphasis on performance in information systems and the increasing complexity of applications, the user/systems analyst/designer must understand the logical and physical structure of both programs and data. The course develops both

skill and knowledge relative to program and data structures. This course is a necessity to develop an in-depth understanding of a language such as PL/I or Cobol. Use of advanced programming techniques and system understanding are necessary in more advanced courses.

Objectives :

1. To continue the development of discipline in program design, in style and expression and in debugging and testing, especially for larger programs.
2. To introduce algorithmic analysis.
3. To introduce basic aspects of string processing, recursion and simple data structures.
4. To introduce concepts and techniques of structuring data on bulk storage devices.
5. To provide experience in the use of bulk storage devices.
6. To provide the foundation for applications of data structures and file processing techniques.
7. To provide the technical foundation for structured systems design.

IS3 — SYSTEMS AND INFORMATION CONCEPTS IN ORGANIZATION

Rationale: This course establishes a foundation for understanding and analyzing information in organizations. Fundamental concepts of systems and information are explained. The integration of these concepts into the organizational structure ties the curriculum to its environment. Basic tools and techniques for representing systems needed in subsequent courses are introduced and introductory skills developed. The course is the introduction to the curriculum in the sense that it

provides a basis for understanding the role of the various parts of the curriculum and provides a broad base for further study. Because the course is a broad, user-oriented introductory course is also suitable as a general introductory course for nonmajors as well.

Objectives :

1. To establish the role of information systems in organizations and how they relate to organizational objectives and organizational structure.
2. To identify the basic concepts that subsequent courses will draw upon: the systems point of view, the organization of a system, information flows, the nature of information systems.
3. To provide students with knowledge of basic techniques and elementary skills in representing system structure.
4. To introduce various types of applications that are part of an information system.

IS4 — DATA MANAGEMENT

Rationale: Because of the emphasis on data in information systems and the increasing complexity of data management, the systems analyst must understand the application, logical structure and physical implementation of file systems and data base management systems (DBMS). This course tries to give the student some technical knowledge about data and related topics. The fundamental purpose of the course is to increase students' understanding of how data resources can be managed to support information systems effectively.

Objectives: To develop an appreciation of the data resource and the issues in managing

by other commonly accepted means.

The following discussion and list of needed knowledge and abilities is repeated from the 1972 curriculum report³.

The first three categories of knowledge and ability are fundamental and may be looked upon as providing tools for applications in the last three categories:

(a) People: Ability to:

- Hear, as well as listen, to others.
- Describe individual and group behavior and predict likely alternative future behavior in terms of commonly used variables of psychology and economics.

• Describe and predict task-oriented, time-constrained behavior in an organizational setting.

(b) Models: Ability to:

- Formulate and solve simple models of the operations research type.
- Recognize in context the appropriate models for situations commonly encountered.

(c) Systems: Ability to:

- View, describe and define any situation as a system — specifying components, boundaries and so forth.
- Apply this "systems viewpoint" in depth to some class of organization — manufacturing firms, government bureaus, hospitals and so on.
- Perform an economic analysis of proposed resource commitments (including specifying needs for additional information and making a set of conditional evaluations if infor-

mation is unavailable).

- Present in writing a summary of a project for management action (suitable to serve as a basis for decision).

- Present in writing a detailed description of part of a project, for use in completing or maintaining same.

(d) Computers: Ability to:

- Understand basic hardware/software components of computer systems and their patterns of configuration.

- Program in a higher level language.

- Program a defined problem involving data files and communications structures.

- Develop several logical structures for a specified problem.

- Develop several different implementations of a specified logical structure.

- Develop specifications for a major programming project, in terms of functions, modules and interfaces.

- Have a grasp on sources for updating knowledge of technology.

- Develop the major alternatives (assuming current technology) in specifying an information processing system, including data files and communications structures, to the level of major system components.

- Make an economic analysis for selecting among the alternatives above, including identification of necessary information for making that analysis, and also to identify noneconomic factors.

- Make "rough-cut" feasibility evaluations (in terms of economic and behavioral variables) of proposed new techniques or applications of current technology, identifying critical variables and making estimates and extrapolations.

- Develop specifications for the computer-based part of a major information system, with details of task management and data base management components.

(e) Organizations: Ability to:

- Understand the function of purposeful organizational structure and of the major alternatives for that structure.

- Understand the functional areas of an organization — operations, finance, marketing, product specification and development.

- Identify in an ongoing organizational situation the key issues and problems of each functional area.

- Know typical roles and role behavior in each functional area.

- Identify possible short- and long-term effects of a specified action on organizational goals.

- Identify information needs appropriate to issues and roles above.

- Understand how information systems are superimposed on organizational patterns on the operational, control and planning levels.

- Have a grasp of techniques for gathering information.

- Gather information systematically within an organization, given

specified information needs and/or specified information flows.

- Specify, given information needs and sources, several alternative sets of information transfers and processing to meet needs.

- Make "rough-cut" feasibility evaluations of such alternatives.

- Develop positive and negative impacts of a specified information system on specified parts of an organization.

- Develop specifications for a major information system, addressing a given organizational need, and determine the breakdown into manual and computer-based parts.

- Articulate and defend a personal position on some important issue concerning impact of information technology and systems on society.

- Perceive and describe several positive and negative impacts of a specified information system in a specified part of society.

- Perform a "rough-cut" feasibility analysis of such specifications of impacts in terms of behavioral and economic variables.

The last four abilities in (d) and (e) above are the key to the approach presented here.

It is also important for the student to have experience in prototypes of work situations. He might:

- Gather information in a "real" organization.

- Work with an operations research

(Continued on In Depth/24)

Computer Science Curriculum

data. Understanding of data structure and storage. Analysis of file organization techniques: sequential, indexed sequential, multilist and inverted files. Some operating system topics like dynamic storage allocation and virtual memory. Survey of data base management systems. Emphasis on technical aspects of file organization and DBMS. The managerial aspects will deal with data as a resource.

IS5 — INFORMATION ANALYSIS

Rationale: This is the first course in the sequence of two that cover the application system development process. This course emphasizes information analysis and the logical specification of the system, while course IS8 covers detailed logical design, physical design and implementation. Emphasis is placed on the iterative nature of the analysis and design process. Exercises and case studies with representative deliverables prepared by the students are used to develop proficiency in information analysis techniques.

Objectives :

1. To review strategies for developing information system applications.
2. To present the development life cycle as a basic concept for managing and controlling application development.
3. To examine both group dynamics and individual behavior in the development process.
4. To present the life cycle phases leading to the determination of requirements and the development of a general logical design.

IS6 — DATA COMMUNICATIONS, NETWORKS AND DISTRIBUTED PROCESSING

Rationale: With the reduction of hardware costs and the increasing sophistication of control software, the inevitable trend toward distribution of heterogeneous processors will accelerate. Systems analysts and their management need to be aware of the data communications technology and its related regulatory environment.

Objectives : To familiarize the student with the concepts and terminology of data communications, network design and distributed information systems; equipment, protocols and architectures and transmission alternatives; the communications environment, regulatory issues and network pricing and management.

IS7 — MODELING AND DECISION SYSTEMS

Rationale: Many modern decisions involve complex decision-making processes. Modeling, simulation, evaluation techniques and generalized and specific decision-making support systems offer the decision maker valuable assistance in assessing the influence of status data and decision alternatives on the real-world environment. The course is valuable to all potential decision makers operating in a complex, technologically rich environment.

Objectives: Study model formulation and solution procedures. Evaluate the use of information systems in decision making and performance evaluation. Distinguish between decision support systems and transactional modes of processing information. Study behavioral aspects of decision making in the decision support environment. Describe the trade-offs involved in the use, design and construction of decision-making systems.

IS8 — SYSTEMS DESIGN

Prerequisite: IS5; Corequisite: IS6, IS7.

Rationale: This course is designed to integrate the areas of computer technology, systems analysis, systems design and organizational behavior to aid the student in designing large-scale application or decision support systems. This course provides a strong introduction to the formalization of the information systems design process. The course explores state-of-the-art systems design and specification techniques. It is a "must" course for those with research interests in software engineering and for those working in an environment where state-of-the-art tools are used. A rigorous approach to information systems design and specification is presented. The course stresses the frontiers of knowledge in the specification, design, implementation and testing of information systems. The course is also useful for those working in a technically advanced information systems environment.

Objectives :

1. To provide the knowledge and skills necessary to develop a physical design and implement an operational system from the logical design.
2. To describe the process of planning for change and the postimplementation reviews and changes. Both technological and managerial aspects of system design and implementation are considered.

IS9 — INFORMATION SYSTEM POLICY AND ADMINISTRATION

Rationale: The information system functions as a support to the overall operations of the organization. Information system development

should be coordinated to meet the information needs of the organization. There are problems of interacting with the relating to the organizational functions for which information systems provide support. There are a number of alternative ways an information systems organization may be structured; the selection among the alternatives is based primarily on matching the information system organization to the overall organization. In addition to these issues of relationships to the utilizing organization, there are issues of internal management for effectiveness and efficiency.

The course is designed as a capstone; it ties together concepts provided in other courses. The information needs of various organizational functions are integrated with information systems through the information systems master development plan.

Objectives :

1. To explain the overall information needs of an organization and the role of information systems in providing them.
2. To explain alternative structures for matching an information system department to the structure and behavior of the organization.
3. To investigate administrative and management issues relative to administration of the information systems function.

IS10 — SYSTEMS DEVELOPMENT PROJECTS

Prerequisite: IS7 and IS8; corequisite IS9.

Rationale: This is one of two capstone courses. It fits together all of the concepts regarding systems development projects.

Objectives: To give the student experience analyzing, designing, implementing and evaluating information systems.

IN DEPTH

(Continued from In Depth/23)
specialist to model a complicated situation.

- Serve as a member of a project team developing a specified application system.
 - Serve as a member of a project team developing a specified information system.
 - Participate in planning and conducting an oral presentation and selling the results of a team project.
- The curriculum does not specify a

single prior background for students entering the information systems curriculum. They may come from a variety of backgrounds, such as engineering, the sciences, technology, liberal arts and business administration. However, a common requirement is that they understand organizations and organizational functions. It is assumed this knowledge will be obtained either prior to taking the information systems courses in the curriculum or concurrently in a pro-

gram that merges prerequisite and information systems courses.

The prerequisite knowledge of organization and organizational functions may be defined in a variety of ways. The committee has chosen the common body of knowledge specified by the AACSB. These represent a basic understanding covering major organizational functions.

If the information systems curriculum is embedded in an M.B.A. degree or follows after an undergradu-

ate degree, the AACSB common body of knowledge will be satisfied. The AACSB statements are given in terms of business organizations, but a corresponding level of knowledge in nonbusiness organizations would satisfy the prerequisite knowledge required for educational inputs into the information systems curriculum. The AACSB common body of knowledge standards are as follows:

To provide students with the common body of knowledge in business and administration, the programs shall include in their course of instruction the equivalent of at least one year of work comprising the following areas:

- a background of the concepts, processes and institutions in marketing and distribution, production and financing functions of business enterprise;
- a background of the economic and legal environment of business enterprise along with consideration of the social and political influences on business;
- a basic understanding of the concepts and methods of accounting, quantitative methods and information systems;
- a study of organization theory, interpersonal relationships, control and motivation systems and communications;
- a study of administrative processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level.

Course Structure

Both the undergraduate and graduate curricula are divided into three components:

1. Prerequisites/premajor/functional area requirements.
2. Information systems technology.
3. Information systems concepts in organizations.

The AACSB common body of knowledge and the 10 information systems courses collectively satisfy the three major components.

The list below illustrates which courses satisfy which components:

Prerequisites/Premajor Requirements/Functional Area Requirements:

- P1 — Computer Programming.
P2 — Quantitative Methods.
AACSB — Common Body of Knowledge.

Information Systems Concepts in Organizations:

- IS3 — Information Systems in Organizations.
IS5 — Information Analysis.
IS8 — Systems Design Process.
IS10 — Information Systems Projects.

Information Systems Technology:

- IS1 — Computer Concepts and Software Systems.
IS2 — Program, Data and File Structuring.
IS4 — Data Base Management Systems.
IS6 — Data Communications Systems and Networks.
IS7 — Modeling and Decision Systems.

The sequence of the courses
(Continued on In Depth/28)

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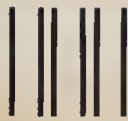


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IN DEPTH

is given in Figure 2. Abbreviated course descriptions appear on In Depth/22. The same set of courses and prerequisites are proposed for both undergraduate and graduate courses. The differ-

ence between the two levels is a shift in emphasis of the individual course material.

Course Descriptions

There are two differences between the undergraduate

and the graduate curricula. First, the undergraduate version of the information system program contains eight instead of 10 courses. The two courses omitted are IS7 (modeling and decision sys-

tems) and IS9 (management information systems — MIS — policy). These courses contain advanced material more appropriate for graduate-level instruction. However, the MIS policy course

could be used to satisfy the AACSB policy requirement. In that case, it would be reasonable to leave it in the curriculum.

Contents Revised

The other difference is that the contents of five courses — IS3, IS4, IS5, IS6 and IS8 — are revised for the undergraduate program. The description is the same for each course at both levels; however, the percentage of time devoted to each topic varies. The percentage of time for the undergraduate version is listed first and graduate percentages second. The contents of IS1 (computer systems concepts) and IS2 (program, data and file structures) and the prerequisites, P1 (computer programming) and P2 (quantitative methods), are the same for both the undergraduate and graduate levels.

The two prerequisite courses are available in most business schools because these courses meet the common body of knowledge required for accreditation by the AACSB.

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About the Author

Jay F. Nunamaker Jr. is chairman of the Department of Computer Science at the University of Arizona, Tucson. He is also chairman of the Association for Computing Machinery's (ACM) Curriculum Committee on Information Systems.

CON RESO

By Richard Raysman

The key to resolving any serious dispute between a user and vendor is to reach a reasonably amicable agreement without resorting to court action. In a successful resolution, the user gets a productive system, and the vendor is paid a fair price for its efforts. One of the better ways to avoid a lawsuit is to identify problems or potential problems at an early stage. Raysman, an attorney specializing in computer law, shows how.

AFTER HE HAS COMMITTED substantial internal and external resources and time to the development of a computer system by an outside vendor, there is nothing quite as distressing to a data processing professional as having that system fail to operate correctly. If a complex system is a complete failure, the entire user organization can experience expensive repercussions.

The key to resolving any serious dispute between a user and vendor is to reach a reasonably amicable agreement without resorting to a court proceeding. In a successful resolution, the user has a system that can be productive in its business environment, and the vendor is paid a fair price for its efforts.

If the point is reached where the vendor and user are no longer speaking to each other, even though the system is inoperable or only marginally productive, then, unfortunately, a lawsuit may be the only realistic alternative to settle the disagreement. Often, in a lawsuit, both sides lose as a result of lost executive time, lost selling time, lost computer processing, associated legal expenses and legal fees.

One of the better ways to avoid a lawsuit is to identify any problems or potential problems at an early stage. If problem areas can be addressed and defined before they have grown and there is an atmosphere of cooperation between the user and vendor, the problems can often be resolved expeditiously and to the satisfaction of both parties.

As a general rule, the vendor is not anxious to bring a problem to the user's attention. Thus, it is up to the user to encourage the vendor to notify the user when a problem arises. One way the user can obtain vendor input during systems development is to ask for periodic written progress reports. With progress reports, the vendor is obli-

FLICT LUTION

gated to bring any problems to the user's attention. When a problem arises, the vendor and user can then work together to resolve it.

Progress reports can serve another useful function in the event that the vendor is not being as candid as it should be. The progress reports serve as a continuing representation by the vendor with respect to the system's development. If the vendor has misrepresented, and if the system eventually fails, the progress reports can be used as evidence in any possible legal proceeding. If the progress reports can be shown to be consistently inaccurate, the reports can be used to the advantage of the user in the lawsuit.

Another way to identify potential problems early is for a user to insist on having at least a moderate amount of involvement in any system being developed by an outside vendor. When user personnel are working with the vendor, if a problem arises, user management can be alerted and a solution can be discussed with vendor management before the problem begins to loom larger. If user personnel are not involved, user management has no truly effective means of obtaining accurate reports on the system's development.

Stronger Action

Once it appears that a problem has become serious and is not being resolved — and that the system has a realistic chance of failing — it becomes necessary to take stronger action. The user should still attempt to proceed in a coop-

erative atmosphere and resist an adversary relationship with the vendor. However, the user must bring the seriousness of the problem to the vendor's attention.

Initially, the user should do its best to effectively identify and document the problem. After the problem has been documented, the vendor should be given written notice of the problem's existence and identity.

The written notice serves several purposes. First, it provides an early written record of the problem, which can be used later for the user's benefit in any possible legal proceeding. Second, it brings to the attention of vendor management the fact that a serious problem exists. Third, it often results in a written response from the vendor, which can also be used as documentation in a legal proceeding.

The user should not be bashful about insisting that the vendor give immediate and effective attention to the problem. A timid user can encourage vendor delay, which permits the project to get further behind schedule and lets the problem grow larger. Often, the user should bring a serious unresolved problem to the attention of vendor top management, which has the power to order sufficient resources to fix the problem. Valuable time can be lost if the right individuals in the vendor organization are not contacted.

If the user does not appear to be receiving an adequate response from the vendor and if the situation (Continued on In Depth/30)

IN DEPTH

(Continued from In Depth/29)

continues to deteriorate, the user may want to consider having a lawyer contact the vendor. Although attorney involvement at an earlier stage in a conflict is not always advis-

able, one important aspect of attorney contact is to bring the problem's seriousness to the attention of vendor management. This step can sometimes act as a catalyst in that the vendor is forced to address the issues

and, as a result, commit sufficient resources to resolve the problem. An attorney should also be able to help the user define the issues and document the problem.

If at some point the vendor either will not or cannot remedy the system problem and the system is either a partial or complete failure, a decision must be made with respect to the commencement of a lawsuit. Whether or not to file suit is a difficult decision and a number of factors must be considered.

Initially, the user must itself be satisfied that the vendor has, in fact, breached a legal duty to the user. If, after analysis, the user determines that the system failure is primarily a result of user shortcomings, then the time and expense necessary for a lawsuit against the vendor would not be well-advised. If, however, the user determines that the vendor has not delivered what it promised, the user can seriously contemplate legal action.

Avoiding Court

One way to resolve a legal dispute is through a process known as arbitration. Arbitration is a way in which to avoid a formal court proceeding. It can occur only with the consent of both parties, either through contract or by submission to arbitration. In an arbitrated proceeding, there are generally one to three arbitrators who are not judges and who hear all the evidence and render a judgment.

Two of the benefits of arbitration are that it is generally faster than a court lawsuit and usually costs less in legal fees. A disadvantage is that the discovery portion of the proceeding is limited, and an arbitration decision is exceedingly difficult to overturn on appeal. Arbitration is also private, whereas a courtroom proceeding is open to the public.

As a general rule, there may be a benefit to arbitration when disputes involve smaller amounts, but in larger dollar disputes, the parties are probably better off in a courtroom proceeding.

Prior to filing a lawsuit, the user must define the legal theories of liability against the vendor. The first obvious legal theory is breach of contract. For example, if the vendor in a written agreement has promised to design and implement an order entry system and subsequently fails to deliver that system, the vendor has breached the contract and is liable for damages to the user.

Often a contract breach cannot be identified as straight-forwardly as simple nondelivery. The user must examine the contract clauses, the proposal clauses and the clauses in the request for proposal and determine as well as possible where the vendor has failed to perform.

Oral Commitments

In addition to the written commitments, a user should also document all the oral representations made by

the vendor. It is a common misconception that oral commitments are not enforceable. In a lawsuit, oral representations are more difficult to prove than written promises, but oral representations can be used to the user's benefit.

Frequently, the vendor in a written agreement has limited its liability to include only amounts paid under the contract. There is a disclaimer for consequential damages, which include lost profits, lost business, lost employee time and additional clerical time. If the user sues only for breach of contract, it may be precluded from collecting for consequential damages.

A legal theory of liability, other than breach of contract, that may permit a user to recover consequential damages is known as fraud and misrepresentation. The fraud can be in the written agreement, but it can also be in the oral representations that induced the user to sign the contract with the vendor.

To successfully prove fraud, a number of important elements must be present. The vendor must have made material misrepresentations with respect to the system. When making the misrepresentations, the vendor should have known that they were false and must have made them with the intention of inducing the user to enter a contract. The user must have relied on the misrepresentations and been damaged as a result. If these elements are present, fraud can be proved.

Once the vendor has defined the legal liability theories against the vendor, the user must determine its own monetary damages. To determine damages, the user must be innovative and creative. Of course, any money paid to the vendor under the contract is considered damages. In addition, the user must quantify any money damages resulting from lost profits, lost business and loss of a competitive edge. The user must also be able to document additional costs.

Punitive Damages

Another form of damages is punitive damages, which are over and above contract and consequential damages. To qualify, the user must prove that the vendor's actions with respect to the relationship with the user were willful, wanton and malicious and intentionally disregarded the user's rights. Punitive damages are generally more difficult to prove than damages for breach of contract or fraud and misrepresentation.

After liability and damage theories have been defined and developed, a legal complaint must be drafted. A complaint is the legal document that initiates a lawsuit. The complaint contains, in moderate detail, the allegations against the vendor. In drafting a complaint relating to a data processing claim, it is important to understand the computer industry.

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some decisions based upon the complaint, is the judge assigned to the lawsuit. Generally, judges are not technically oriented and do not have a full understanding of computer-related technical issues. Because of this, it is important that the allegations in the complaint be made clear and reduced to nontechnical layman's terminology.

After a complaint is filed, the defendant must file an answer. In the answer, the defendant usually denies the claims made in the complaint and frequently files counterclaims. For example, for full payment under the contract.

Discovery Phase

Once a complaint and answer have been filed, a discovery process begins. In American courts, each party can compel the opposite party to divulge information in the possession of the other party.

One method of discovery is referred to as a deposition. In a deposition, an employee of the vendor or user must answer questions with a court stenographer present. For example, the user would want to take the deposition to the vendor salesman who originally sold the system. The salesman could be questioned about oral representations he made. The user would also want to take the deposition of the vendor manager of the system project. The manager would be questioned with respect to the progress of the projects and any deficiencies in the project.

Another form of discovery is interrogatories. With interrogatories, one party can compel the opposing party to answer written questions. The written questions can relate to financial matters, officers and employees, existence of documents and other related matters.

Another form of discovery is demand for documents. One party can demand that the other party produce reports, memorandums, correspondence and other related documentary evidence.

At some point in the legal process, it is probably advisable for the user to retain an independent expert witness. An expert witness can assist in framing the legal and technical issues. If the case goes to trial, the expert witness can offer independent and qualified testimony on behalf of the user.

During the pendency of the lawsuit, a number of legal motions will probably be made. Depending on the nature of the motion, it could have a serious effect on the outcome of the lawsuit. For example, there can be a motion to dismiss the complaint, a motion to change venue, a motion to compel discovery or a motion to prevent discovery. Even if a motion is denied, it will usually cause a delay in the lawsuit.

As the lawsuit progresses, and if the user has a meritorious position, it is likely that some settlement discussions will take place. To effectively

discuss settlement, both sides should have a full understanding of the technical issues involved. Frequently, a vendor will not seriously begin to discuss settlement until the case is ready for trial.

If the case cannot be settled, the user must be prepared to try the case. To be successful, the user must prove that the vendor did not deliver as promised, and the user must prove its damages. If, after trial, there is a judgment for a large amount, the

vendor will probably file an appeal.

Final resolution of conflicts between users and vendors can be a time-consuming, costly and complex matter. Both sides must address the problems methodically and with the objective of narrowing and defining the issues. However, if the system is a failure and there can be no amicable resolution, the user who wants to go through the courts must be prepared to invest the necessary time, energy and expense.

About the Author

Richard Raysman is an attorney with the New York law firm of Brown & Raysman and chairman of the New York State Bar Association Computer Law Subcommittee. Raysman specializes in contract negotiations, litigation, protection of proprietary information and other areas of law that relate to computers. He has written and lectured extensively on computer law for both attorneys and DP professionals.

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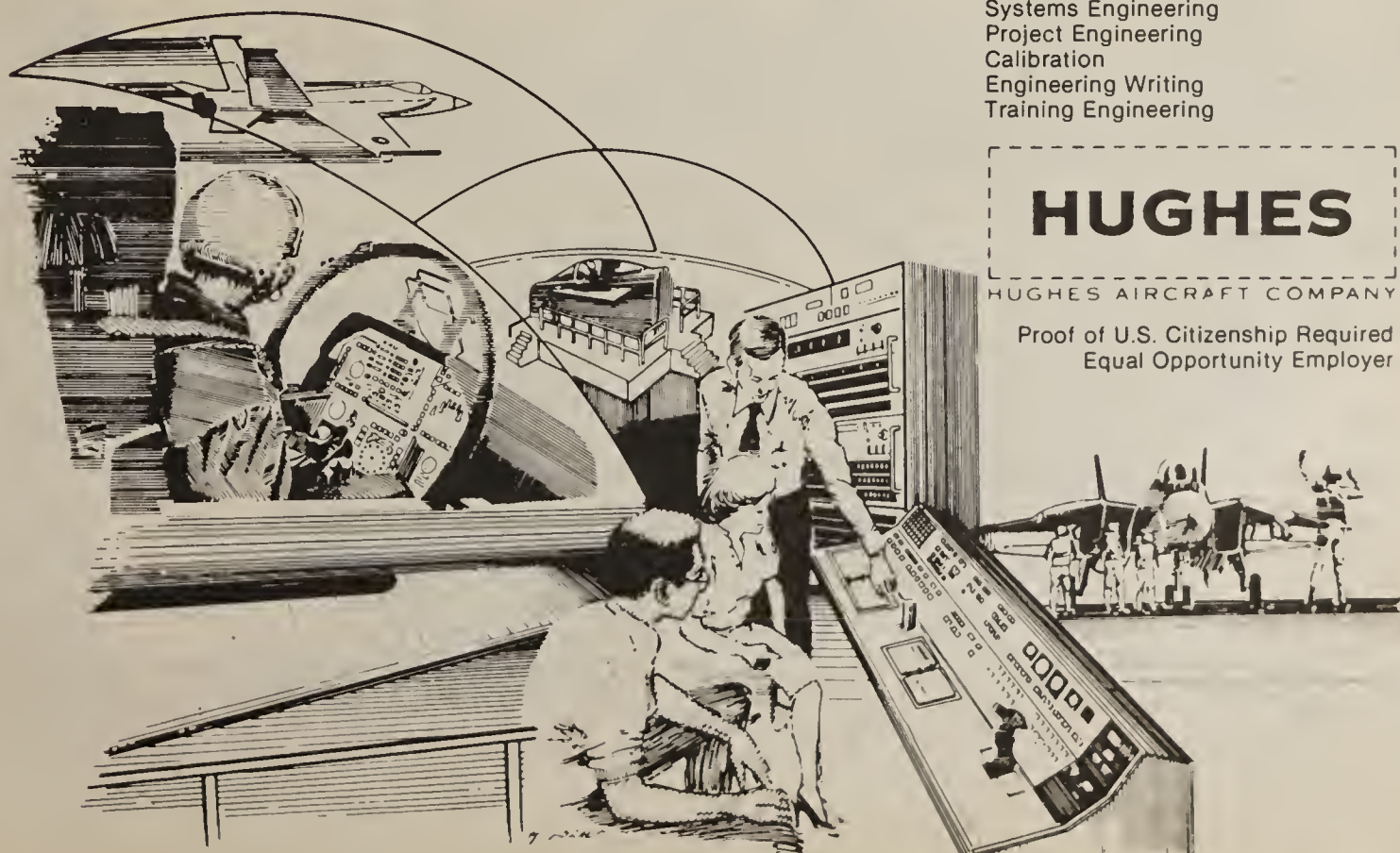
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September 28th, 1981

SPECIAL REPORT

 **COMPUTERWORLD**
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

September 28th, 1981

SPECIAL REPORT



AUTOMATING THE OFFICE:
AN EVOLUTION IN INTEGRATION



What the heck
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 The Office of the Future.
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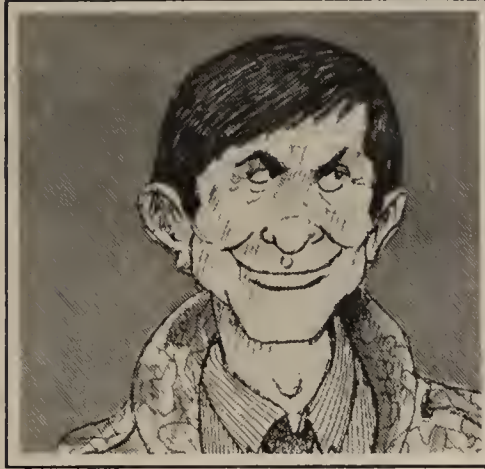
Most people aren't quite sure what it is and how it will affect their organizations or themselves individually. Poised on the brink of this new technology, they're waiting to learn about it — and to hear some success stories

This Special Report has been put together by Computerworld to help managers weigh the potential benefits of office automation against the danger of diving in headfirst without being sure they know how to swim.

Special Report

Editor Ann Dooley
 Art Director Tom Monahan
 Cover Design Garrow Throop

The photograph of the modern office on the cover is courtesy of Soep Associates, Allston, Mass



Office of Tomorrow: What to Expect • SR/5

Offices are much the same as they were 50 years ago — but old-fashioned procedures are becoming a thing of the past.

Guerrilla Tactics SR/7

Implementing an office automation strategy plan in an organization calls for action, instinct and sometimes even a survival game plan.

Why Go To Electronic Mail? SR/9

The answer: 1. To save you time. 2. To save you money.

Crisis in the Work Place: Selling the Staff on Office Automation SR/11

People are afraid of change. How can you convince them it can work to their advantage?

Boston Bank Takes Office Automation Highway Via Well-Traveled Word Processing Route SR/12

Here's how one user went beyond word processing into an integrated office that's making everyone happy.

What Price Comfort? The CRT Terminal In the Office SR/15

Until terminals and their surrounding work environment are designed with human factor elements in mind, the automated office may never prove successful.

Office Automation: At Which Stage Are You? SR/17

Office automation should be implemented in a series of stages that need to be carefully planned if the concept is to be an effective force in your organization.

Is Office Automation The Best Darned Thing You've Ever Seen?

No SR/20
Maybe SR/21

Office automation may be a godsend to an organization, but what's it doing to the employees who work with it?

Teleconferencing SR/29

Who can benefit from teleconferencing? Here's an inside look at what it can do for you.



Mid-Level Managers: Will They Fade Out As Automation Changes The Office? SR/29

Automation will change the nature of work in the office — and if line managers don't watch out, they may not be needed any more.

Office Automation Market: Too New to Call SR/35

The office automation market is erupting with new technologies and products. Here is a look at how several of the major vendors view the explosion.

Office of the Future Requires Careful Planning SR/36

Users who are implementing an office system should assess their particular needs and prioritize their importance to the organization.

Women Office Workers In a Race Against Time SR/40

Automation may be turning women into second-class citizens unless the emphasis changes from technology and cost-cutting to an increased quality of work life.

Firms Finding Graphics Essential to Office SR/43

Here is an overview of how graphics will facilitate an executive's job.

Success of Office Automation Depends on User Acceptance, Not High Technology SR/46

The automated office will fail if it doesn't succeed with the staff. The first group that has to be sold on its merits is the managers of the user departments.

Westinghouse Electric's Pilot Program Grows Into Global Network SR/50

Productivity has increased at this user's site because of careful planning and execution of automation throughout the organization.

Data in WP: Very Valuable and Very Easy to Steal SR/53

The office is a less secure environment than the computer room, but the information that is being accessed is frequently more critical to an organization.

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Most firms are still only planning to integrate the WP and DP functions, but the need to do so is a reality too important to ignore.

WP Service Bureaus A Way to Handle Peak Loads SR/60

When your system can't handle your work load at peak times, a word processing service bureau may be the answer.

Who Should Manage Area of Word Processing? SR/64

Users know their applications, but the MIS department knows the technology.

Standard Oil Unearths Plan for Office Success SR/65

A large-scale user strikes a gusher with its integrated office system.

Workers Said Fearful Of 'Creeping Automation' SR/68

Training is critical in convincing staff of the new technology's merits and ease of use.

Food Firm Finds Office Automation Fortifying SR/69

Just beginning to implement an office automation system, this user is investigating every possibility before proceeding.

Office of Future Seen Answer To Paper Blizzard SR/71

More advanced communication and information distribution procedures must be utilized before we are snowed under by paper.

WP Now Brings 'Message Center' To Heart of Office Environment SR/74

Old-fashioned channels of communication must open up to accommodate more efficient, speedier modes of communication.

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'Office of Tomorrow': What to Expect

By Amy D. Wohl
Special to CW

Office automation is an idea whose time has come. We will see an amazing revolution in the next 10 years — but before we banish the Office of Today and embrace the Office of Tomorrow, perhaps we should demand a status report: a State of the Office.

Today's office is more reminiscent of the 19th century than one might imagine. For instance, most of the tools office workers use today — telephones, typewriters, dictation equipment — are really 19th century inventions. The office has not changed a great deal in the last 50 years. Most workers still write with a pencil (or a felt-tip pen), talk on the telephone and send communications to other offices via the U.S. mail.

Some offices, however, are in the throes of change.

The revolution in computer technology has begun to move out of the DP center and into the office. For the past 15 years, the office use of computer technology has been limited to certain types of batch processing applications (like data entry), performed by low-level clerical workers, or to specialized systems like word processing.

But lowered cost curves in microcomputer technology, increasing degrees of computer literacy at every level of the population and an immensely heightened awareness of the lack of productivity improvement is about to change all this. In the next few years (starting yesterday for some pioneering companies), we will see:

- Office processes replicated, enhanced and ultimately changed through computer support.
- The spread of computer-based tools (initially terminal-like workstations) to every worker, at every level of the business organization.
- Vastly changing cost curves for computer-

based technologies, as these devices are broadly accepted into the consumer marketplace.

- By the end of the decade, at least one computer-based workstation for every worker. Many workers will have one at the office, one at home and a portable device in their briefcase.

• The face of the office itself changing as it becomes possible to do many kinds of work without physically providing a common work place.

How will this come about? What effects will it have on office workers? And when will it occur?

Already this year, the pace for office automation has changed perceptibly. In 1980, most business organizations were talking about office automation; in 1981 some of them are beginning to take concrete steps. By 1982, a significant number of large firms will have begun planning for office automation. And some of them will begin to implement actual plans.

By the mid-1980s, most large firms will have made initial moves, and many will be well along the office automation curve. By the end of this decade, office automation will be a norm in large firms, common in medium firms and not unusual in smaller ones.

What will these automated office workers be doing? Largely the same things they do now. But they will do it at computer-based terminals, equipped with software.

Processing will occur locally, using very cheap, high-speed microcomputers. Whenever it is more economical or efficient to share a peripheral where more processing power is needed or where the information sought exists on another node of the network, the system will automatically reach out for that additional power or capability. We will not stop using big computers; neither will we provide office automation to everyone by hanging dumb terminals directly on

mainframes; it will be more practical to use networked intelligent workstations.

The process is starting right now. It is estimated that IBM and Xerox alone will sell 200,000 personal computers (IBM PCs and Xerox 820s) in 1982. They will largely go into offices, in quantity, as workstations for secretaries and professional workers, providing some instant office automation — and forging the growth path for what is to come.

Toward the end of 1982, some of the network technology will begin to settle down and we will be ready to start hooking up some of those local networks in significant numbers and sizes. The little computers will, of course, already be functioning in the global networks, camping onto existing data communications systems.

Will this change the office? And how!

For example:

- We will be a lot less dependent on paper and the process of storing it, finding it and distributing it. This means fewer filing cabinets, fewer filing clerks, less physical mail.

- Lots of tedious work (like alphabetizing lists) will "disappear" as clerical work and become machine functions; this is happening already in some smart companies.

- Professionals and managers will become less dependent on secretaries for tasks like typing and information retrieval. On the other hand, secretaries can become assistants.

- Entry level workers will need a different set of skills, with computer literacy becoming a job requirement.

And going to the office — wherever that is — may be a lot more fun.

Wohl is president of Advanced Office Concepts Corp., an office automation consulting firm in Bala Cynwyd, Pa.

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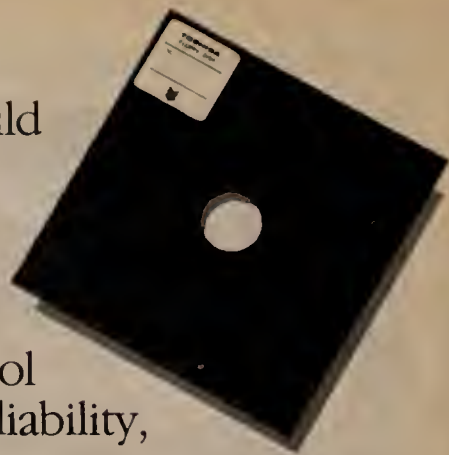
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VSBC (Very Small Business Computer)



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T200

T200/T250

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storage capacity: T200: 280KB × 2
T250: 1MB × 2
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characters per line: 136 characters

Software

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GUERRILLA TACTICS



Survival in the automated office jungle calls for action now. The code of survival is evolution — DP managers must take risks by building systems today that can be changed tomorrow.

By Michael Goldman

Special to CW

DP managers who believe they can delay implementation of the automated office are high risk takers. They could unexpectedly find:

- Their company's largest on-line terminal system is controlled by the print shop.
- The telephone manager is getting credit for reducing the programming backlog by 50%.
- Self-appointed data base administrators are creating an unsupportable demand for management information.

To survive, DP managers must act now. They must understand what types of services to provide, whether or not they are in competition with other departments and something about the various office vendors.

Advanced office systems will be continually evolving over the next two decades. As a DP manager you cannot delay acting on it until all of its possibilities are clearly understood. Determining all of the needs of your users will be nearly impossible. Build instead on an architecture where all future functions will operate within a predefined hierarchy.

The early electronic office will be automated, but functionally unchanged.

The highest payback will be the enhancement of execu-

tive work time. Over the next several years, hardware and software will be designed primarily for use by decision makers. These products will not exist just to reduce time spent on a project, but rather will increase the quality of the work performed.

From the manager's terminal there will be instant access to company data bases designed specifically for decision making and monitoring. There will also be facilities to query external data bases for trending and demographics.

Terminals and Networks

The increased use of advanced office systems implies terminals, one of which will eventually be found on every manager's and secretary's desk. Look for the greatest demand to occur just after the chief executive officer gets his.

Terminals will range in price from \$1,000 dumb CRTs to \$5,000 microcomputers, depending on where the processing facilities are to be supported. A \$13,000 IBM Displaywriter can run without a CPU. An IBM 3101 at \$1,500 cannot. When you consider that a medium-size company can require 50 terminals plus 50 letter quality printers, multiplication will determine centralized vs. decentralized processing.

Keep in mind that if no relief for WP is in sight, users will purchase those 500 expensive microcomputers — one at a time.

Some will resist terminals. One high-placed officer insisted that all his incoming electronic mail be typed by his secretary before he would read it. This was finally corrected when he was taught to operate the terminal. Then there will be others who will want one in their office, one at home and one to use on the company plane. At least one will ask if his kid's Apple II computer can be hooked up.

Take-home terminals pose their own problems. Acoustic couplers will not hold onto a princess telephone and modular jacks have trouble with phones screwed into the wall. Terminals that malfunction once installed in a home are another threat. What kind of service team do you send out? (That's right, you may be making house calls.)

Problems resulting from wiring the office can be solved by several alternatives:

- Lay your own lines. Put in a cable between the computer and the terminals. Problems may arise when the number of cables becomes unmanageable. The cost of running individual lines can vary from \$100 to

\$2,000, depending on distance and physical construction.

- Coax. The knights of the round cable will provide premise loops to plug terminals into what will support high speeds and make intelligent routing decisions. Cost and flexibility are large factors. (Running a loop in an existing building can cost several hundred thousand dollars.)

- Telephone exchanges — the supercontrollers. PBX manufacturers appear to support voice and data over the same wiring. Terminals can be routed by dialing the phone, but each terminal connection will require multiple wire pairs where the telephone needs but one. You may be required to rewire the entire building and movement will be limited to prewired locations.

- Voice/data splitters. A small converter will handle all station traffic on a single pair of wires. Voice and data are frequency divided with voice traffic going to the PBX and the data to a CPU, but are limited to internal building use only and provide no routing capabilities. Cost will be around \$500 per station.

Whatever alternative you pick should be selected last and implemented first. Once you determine your terminals, their functions and to-

pology, the proper type of internal network should fall in place.

Communications is the single most important ingredient of advanced office systems. If you have not gotten control of it in some form, advanced office systems will fail. In the past, data and voice communications have been intentionally kept separate, whereas advanced office systems combine the best of both.

Last year's terminals should not be obsolete. Several hundred existing terminals in production cannot be denied access because "that was before." Services provided to the office down the hall must be as easy to use as those across the nation.

One word about expanding your contact with a phone company: After working with computer vendors you will find it is one thing to deal with a company that acts like a monopoly and quite another thing to deal with one that is.

Users will experience four phases as they begin using the system:

Phase I — Intimidation. They will be convinced that learning the system is beyond them. Anything that goes wrong will be considered their fault.

Phase II — Pride. After mastering some functions
(Continued on SR/8)

(Continued from SR/7)
they will feel that it is wonderful to use a computer. This phase normally begins after a modest productivity gain. Small groups of people will hunch over the user watching the system being put through its paces. Sometimes whole families are brought in on Sundays to see it work.

Phase III — Disappointment. Once the user is confident, happy and vulnerable,

disaster will generally strike. A most common example is when two hours of input disappears and the only residue is a cryptic error message.

Poor documentation also adds woes when a function does not work as advertised. "What do you mean I just sent my updated resume and salary to everyone on the system?" This phase is identifiable when it is observed that typewriters have been pressed back into service.

Phase IV — Acceptance. Advanced office systems are finally regarded as just another tool and its productivity and problems are taken for granted. New functions become easy to introduce and the advanced office system starts paying back its investment.

Instruction will be a continuing and expensive task. The training staff must first educate the new users as they receive their terminals.

Most clerical support will be available for instruction, but capturing their boss for two hours will be difficult. Therefore, create a fountain of knowledge in each department that can answer questions or provide informal education. Train the secretaries to show the boss how to use the system.

Temporaries pose new problems. Some form of minimal instruction needs to be available. Once temporaries

are trained they can be used again at a later time. See that someone in the personnel department keeps track of their names.

Management Data

User programming is an important concept, but the key will always be data. Executives with terminals will want to access information about their department and everyone else's department.

This is the data that reveals how a company is performing today as compared to yesterday and, more importantly, how it may be doing in future years. This is the advanced office system payback and it can be a political dogfight to provide it.

Establish a corporate data overview illustrating where data interrelates across the company. Questions about the flow of data will surface that may help a company streamline itself.

Decision on Accessibility

A decision has to be made between the two philosophies of access: "implied," where the system protects everything automatically, and "explicit," where the user must determine levels of security on its own.

In your zest to provide data and documents to everyone you must be careful not to put certain items into the public domain. For example, legal documents kept on automated office systems can become available to opposing counsel if it can be proven that those records are accessible by practically anyone.

Before implementing any part of the automated office system, produce the overall plan. Doing this identifies your department as the prime motivator of the automated office. Determine in what order you will implement across the company. Look for a volunteer organization to install the pilot system. Do not volunteer DP.

You want an enthusiastic, unbiased user to sell the rest of the systems for you, so locate that one group that is always anxious to try new technology. While the bugs are worked out you will at least have understanding users.

Implement horizontally. Select groups of peer managers, their immediate subordinates and secretaries. The greater majority of communication takes place in this structure.

Finally, involve the secretaries. They are the first real users. They know how to run an office operation. You're just beginning.

Goldman is assistant vice-president at Lincoln National Corp., Fort Wayne, Ind.

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Why Go to Electronic Mail?

1. To Save You Time
2. To Save You Money

By John M. McQuillan

Special to CW

Why use electronic mail? To save time and money.

Electronic mail is a term used to describe many different kinds of technology, ranging from facsimile to communicating word processors to message-switching or Telex systems and finally to computer-based message systems (CBMS).

A good CBMS has been estimated to save the typical user an hour per day. We at Bolt Beranek and Newman, Inc. have arrived at this estimate from our own investigations and from comparisons of several other studies.

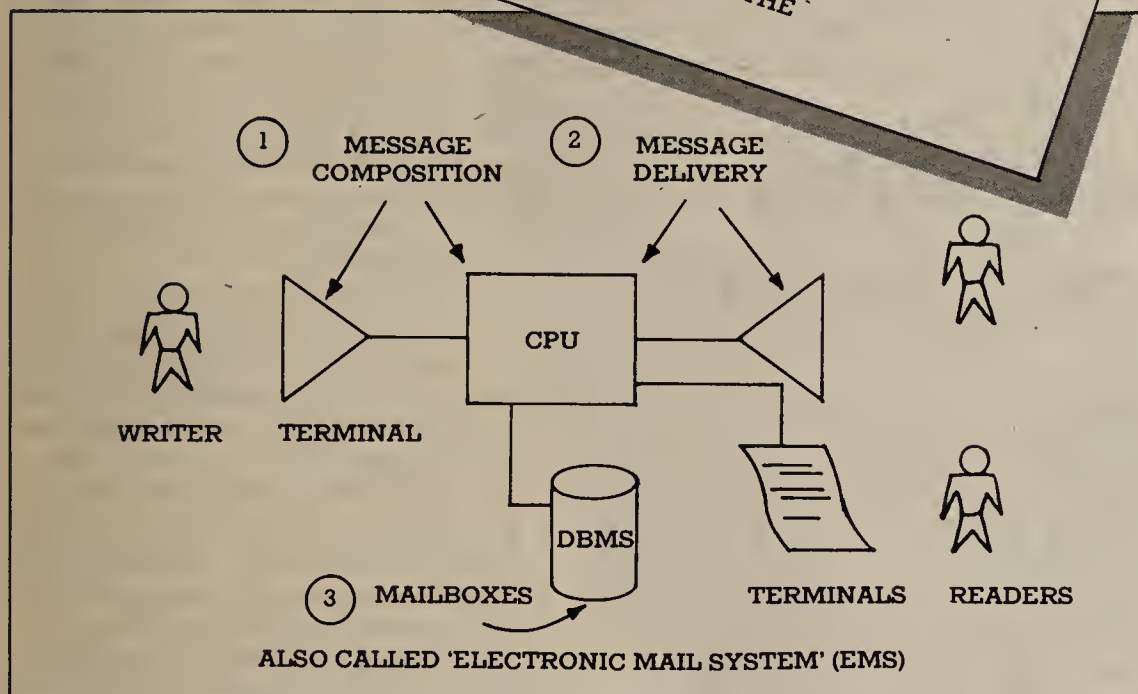
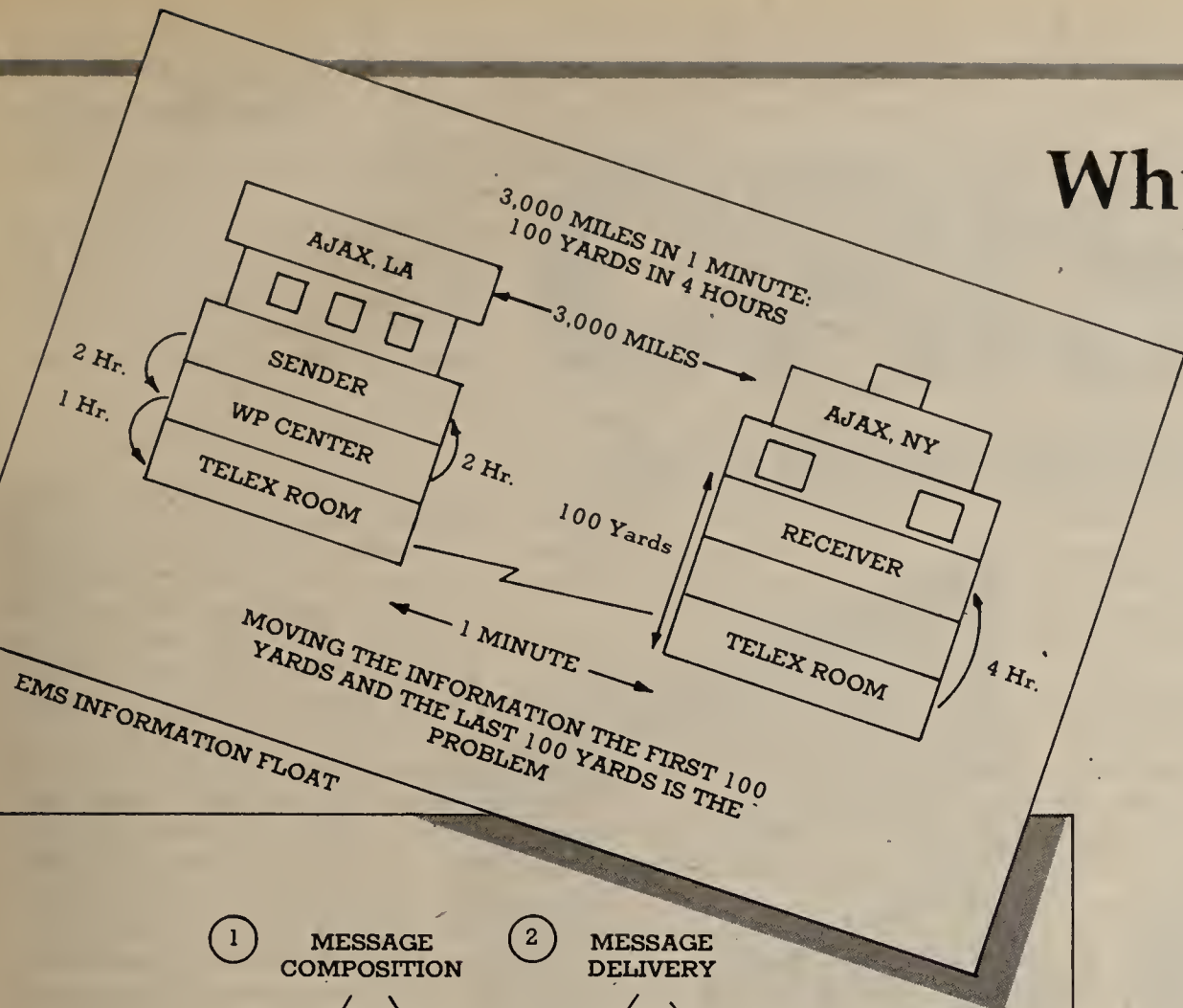
A CBMS can be defined as a computer-based electronic mail system that stores, receives and transmits messages using electronic mailboxes assigned to each end user.

As the top figure shows, a CBMS is comprised of three constituent technologies: word processing to assist the user in message composition, computer networking to assist in message delivery and data base management to provide for storage and retrieval of information in electronic mailboxes.

Regarding the time savings involved, Dr. James Bair of Bell Northern Research estimates the total potential savings, based on a high level of use, is two hours per day. He breaks this down as follows:

- A CBMS can eliminate 30 minutes per day of wasted time in the office. Only 28% of telephone calls are completed the first time, whereas 100% of computer messages are. Phone calls average nine minutes whereas electronic messages can be sent in three minutes.
- A CBMS can reduce the interruptions and restarts that can waste up to one hour per day because people become ineffective if they are interrupted too often.
- A CBMS can eliminate up to 30 minutes per day of the pro-

(Continued on SR/10)



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(Continued from SR/9)

fessional time spent on various clerical tasks. This is time spent copying information from one place to another, taking short notes and the like.

Studies by Bair and others such as Booz, Allen and Hamilton, Inc. and IBM confirm that managers and professionals spend up to three-quarters of their time in communications activities. Six hours out of every working day are spent in communications!

There is good evidence that a CBMS can save one or even two hours if people use a CBMS instead of present forms of communications.

Computer-based message systems were introduced in the early 1970s to provide full end-user functions. These systems have been termed per-

sonal message services because they do more than transmit messages; they process information.

Directly to Users

They put electronic mail directly into the hands of the user, providing flexible editing, easy filing, query and retrieval and natural addressing of other users by name or nickname. In addition to the electronic equivalent of an "in" box and an "out" box, a CBMS may provide for electronic files, which the user can adapt to his specific needs.

A CBMS combines the speed of the telephone and the permanence of a letter and also avoids their problems. A CBMS frees the user from telephone tag and from telephone tyranny; he can use time zones and work

shifts to advantage instead of fighting them. The user can read messages when he wants and respond when he wants.

Second, compared to the paper mail, a CBMS cuts down the paper flow that plagues many offices. Information is often very slow to complete the circuit from one desk to another and back again (information float). This is even true for older forms of electronic mail, like Telex (see bottom figure on SR/9).

A CBMS distributes the information, not the paper, and therefore keeps everyone informed at electronic speeds. A good CBMS provides more information, fewer interruptions and less paper.

What are the advanced capabilities that buyers are looking for in CBMS

software product? A good CBMS offers more than just electronic messages and correspondence management. It provides for general-purpose information management.

Effective Time-Saver

Experts in time management make several recommendations on saving time that are familiar to most managers. These techniques can be applied even more effectively using a CBMS.

- First things first. Work on the most important thing first. Start your session by scanning your "in" box to review all of the material.

- Handle each item only once. After reading a message or other document, you have the choice of deleting the document, filing it, replying to it or forwarding it to somebody else. There is no need to go back and handle the document again. Secondly, once the information has been entered in electronic form there is no need to reenter it.

- Eliminate repetition. Never hand-write or type the same thing twice. You can have prefilled forms if you find that you are sending the same memo or letter to people over and over again.

- Batch your "paperwork." You can get in the habit of having regular CBMS sessions every two days, every day or even several times a day. In each session you can log in, check for new messages, send the messages you want and do it all with very few minutes of your time and at a point in your schedule when you are free to do so.

- Minimize meetings; maximize results. Use nonsimultaneous communications. A CBMS provides a general way of eliminating some of the time wasted in meetings by replacing it with time spent in electronic information exchange.

If you have a planning meeting coming up, distribute background information to the participants in advance. If you are having a news meeting, consider eliminating the meeting altogether and broadcast the news by CBMS to an address list.

If you want to hold an action meeting, notify the participants in advance of the pros and cons of each alternative. You might even ask the participants to make up their own minds and to transmit their conclusions in advance of the meeting.

Reduces Meetings

Finally, you can reduce unscheduled meetings by urging people to send you a CBMS message with the question that they want to ask. Often this will eliminate these meetings altogether.

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McQuillan is president of BBN Information Management Corp., Cambridge, Mass.

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CRISIS

IN THE WORKPLACE

By Carol T. Gaffney
Special to CW

What really happens to people when office functions are automated? What motivates an employee to sabotage a system or to quit a long-time employer? What are people reacting to — the technology or the way the technology is introduced? In particular, why is the typical reaction to office automation strong, negative and pervasive?

Office automation creates a crisis in the work place upsetting routines, disrupting social relationships and threatening people with the unknown. Managing this potentially disruptive process so that human needs are met without compromising technical and operational requirements needs to be addressed.

Office automation invades functions, modifies access to information, changes reporting relationships and affects specific job categories. While there is little doubt that this disruption will reap valuable long-term financial and operational benefits for the organization, the short-term individual reactions may undermine this return.

In automating an office, we are upsetting the strategies each employee has developed to survive in this social system to meet individual needs. We come in to a setting where people are more or less happy with the status quo — at least it is a known quantity — and wrest control away from the employee.

All too often, office automation has proven to be "dangerous" to everyone involved, causing equipment to be ignored, managers to use printouts as doorstops and secretaries to use word processors merely to type.

Frequently, office automation has not progressed with the availability of technology because of the failure to recognize basic human needs. It appears, then, that the way office automation is introduced to people in a work place — how people are involved in the process that effects and threatens them — is crucial.

Here are the key adaptation concepts:

- Adjustment to change is a five-phase predictable process. First is self-pity (why me?), then denial (not me!), then anger (I'll get even.),



Photo by P. Segal

Selling the Staff On Office Automation

then bargaining (I'll cooperate if you will . . .), finally comes acceptance (what change?). Each individual moves through this process at his own speed and some may get stuck in one phase if not helped to move on.

- If people are involved in situations and decisions that affect them, they are better able to meet change. They do not need to make the decisions, but they do need opportunities to provide input.

- You will have to motivate for acceptance of change. Provide opportunities for meeting personal motivations (power, achievement, affiliation) through participation. Set up rewards for participation (status, money, power, access to information).

- You must know your audience. To aid adaptation, each installation must be planned and presented to suit the personality of the work place as well as individuals within the work place. Will the organization be motivated to install office automation by "first on your block" or is it motivated by the internally

generated pride in doing tasks well.

Are decisions made here analytically or intuitively? Are key decision makers quick to judge with minimal facts or do they support strengths?

In summary, allow people to choose the change and give them time to get used to it. Resistance to change is normal; if you do not get it, worry. Expect bumps, so allow for shock absorbers (meetings, time, humor). Package your approach to suit your audience.

Structured Approach

Three strategies underlie successful adaptation to change: preparation, participation and practice. "No surprises" is an effective policy for avoiding upset. Participation in the change process helps structure communication and limit surprises. Finally, providing the time to live with the change facilitates acceptance.

It is important to gain an understanding of the special needs of a specific organization by describing the per-

sonality of the work place, defining the functional needs of the operation and then involving the employees in a variety of structured activities related to problem solving, decision making and planning that are appropriate to their expertise and responsibility within the organization.

Diagnose company personality. Basically this includes a detailed history of the organization and a picture of its functional aspects. If possible, it would be helpful to gain a sense of the emotional climate of the organization. How do the employees perceive their work place? Are employees basically happy or unhappy now?

There are a few key functional purposes served by the analysis of data obtained in this step. You know the general technological problems to be solved. You have a good sense of what has and hasn't worked here relative to adaptation to change.

And you have a goldmine of information about how to sell your approach and how to communicate that within

this work place. What are the specific barriers to change and facilitators to change?

Does the chief executive officer see himself as an innovator in his field? Have other projects gone well here? Do employees make their careers here and are therefore less likely to leave when the going gets tough?

This has also been a non-threatening preparation opportunity to begin the participation process. You have asked people for information, opinions and advice. They've helped you.

After determining the company personality, the next step is to design and implement a structured approach for managing this change process — the problem-solving matrix.

Essentially, small task forces should be formed to advise how specific changes should be made. Four levels of task forces are suggested. A cabinet of the key decision makers will oversee the whole office automation effort by setting policy and working out the various interdepartmental issues related to function and ongoing information exchange. The cabinet decides corporate-wide policy issues.

The steering committee decides procedural issues from a corporate perspective. It is made up of key line managers at every level representing the major organizational functions.

Finally, two kinds of task forces will be developed. Coordinating task forces will handle cross-functional issues at the specific procedural level (that is, how will word processing receive information from field accounting and what reports will they send back when?).

Ad hoc task forces will be created within a function to advise on how the transition should take place and how systems and procedures should be different with the new process. Once their assigned task is completed, the task force is disbanded.

To make this process work, all groups should receive training in problem-solving and idea presentation techniques. The group meetings should be short, focused and structured, keeping frustrations to a minimum.

Gaffney is national director of Acorn, a nonprofit human service business in Wayne, Pa.

Boston Bank Takes Office Automation Highway

By William Synott
Special to CW

BOSTON — When we speak of office automation, we are really talking about (mini)computer processing performing very specific office tasks and functions never before considered automatable.

DP professionals in service industries have spent the past 25 or so years automating transaction-oriented functions with the result that we are now shifting our focus from the back office to the front office — the places where managers and professionals make the decisions that run the organization.

At the First National Bank of Boston we started our office systems pro-

gram (a term we prefer to office automation) in about the same way as most other large organizations — via the word processing route.

In the mid-'70s it became necessary to replace aging magnetic card equipment in our Secretarial Services Center. Concurrently, our law office was interested in word processing equipment for its operations.

Initially, we set out to attack typing tasks throughout our head office with a view toward centralizing where possible, that is, moving typing tasks from some 350 personal secretaries located in various offices throughout the bank to the Secretarial Services Center.

The departmental secretaries most

interested in typing could be transferred to the center, while those preferring administrative work could remain in their departments, but because of their reduced numbers, would have to double up the number of principals served and share tasks previously done for a single boss.

The theory behind this kind of reorganization was that we could manage with many fewer personal secretaries, and at the same time, get the typing done more efficiently.

In the mid-'70s, this was one of the more prevalent approaches to conquering typing inefficiencies, and it worked well in some organizations, or so we hear. However, at Bank of Boston we believed that this kind of

reorganization would cause far more problems than it would solve because of the adverse effect it would have on the personal relationships between secretary and boss.

We also believed that because most of the payroll dollars are paid to executives, professionals and managers, they should be the targets for automation, not the clerical staff. Thus, in selecting equipment, we looked not only for an effective word processor, but also for one capable of performing more advanced functions as well. After much research, we selected shared logic equipment.

New equipment was phased into the Secretarial Services Center, where the objectives were to replace obsolete equipment with newer technology, increase typing efficiency and cost-justify the replacement.

At the same time, similar equipment began to be installed in user areas as well, beginning in the law office in which the primary objectives were to reduce the time spent by the professional staff in reading, revising, editing and rereading complex documents and to reduce document revision turnaround time. In both instances, the objectives were met during the phase-in period, but more importantly, we gained valuable hands-on experience with a new technology.

Office Systems Group

Having selected a word processor a good deal more powerful than a mere text editor, we organized an Office Systems Group (OSG) within the Information Systems & Services (ISS) Division to exploit its capabilities.

In both secretarial services and the law office, imaginative operators began experimenting with its programmability, discovering that it was really quite easy to store keystrokes (programs) for subsequent use. As new utilities such as sort and math became available, we began to find dozens of applications for them in user departments.

Between the OSG and the user departments, word spread rapidly and the capabilities of text processing systems became a subject of great interest throughout the bank. Many departments demanded to be "next" to get their own equipment.

The Finance Division was one of the earliest users of the mathematics package, with the user doing his own programming to handle complex financial reports.

Major factors in users' desires for immediate access to an office system were, and still are, that they find it easy to learn, they can program it themselves and that they can have it now. These facts of life are very different from what, historically, our systems and DP professionals have served up to users.

Previously, users wishing to automate had been completely at the mercy of systems professionals for any kind of automation and because of priorities and scarce resources they sometimes waited months or years for results.

While the users control their own systems once installed, Bank of Boston's ISS Division (OSG) maintains central control over the acquisition

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of the office equipment used.

Analysts in the OSG perform an operational review in a given office to determine whether the work lends itself to an office system solution. A recommendation is then made to the department head and, upon approval, OSG manages the implementation, which includes acquisition, training, installation and custom programming of any application unique to that operation.

To date, most of the more complex office systems programs have been written by OSG but, increasingly, with a bit of experience, a number of users are now doing their own programming, a practice that the ISS Division heartily encourages.

Savings in 'Soft' Terms

As for cost justification, it is the practice at Bank of Boston to cost justify all major systems installations on the basis of a return on investment acceptable to the priorities committee, the body responsible for passing on all major DP expenditures. With respect to WP, this is fairly easy to do in a production environment such as a centralized secretarial area, where output/productivity can be readily measured and savings are in terms of jobs saved.

But when savings are expressed in "soft" terms affecting professionals, such as getting better information faster and more reliably, the benefits usually do not translate into savings in jobs; thus, the results become more difficult to measure with anything approaching reliability. Justification in these cases can only be in the form of testimonials given by satisfied users.

This is exactly what happened at Bank of Boston. With the exception of our centralized secretarial centers (of which we have four), we have not needed to cost justify our user installations, thanks to user enthusiasm and support.

In order to satisfy the priorities committee of the value of office systems to management in user areas, we asked the early users — law office, finance division and audit department — to address the issue of how they would cope if their office systems were to be removed and they were to revert to a paper-based system.

All three areas suggested that we could expect an insurrection bordering on a managerial strike if any such move were attempted. The priorities committee, most of whose members now head up departments using office systems, were convinced of the productivity value of these systems to managers, not just secretaries. As a result, they gave ISS a vote of confidence and new acquisitions no longer must be approved in advance.

A report is now submitted quarterly covering additions, changes, deletions (there are some) and total monthly cost. The committee can still exercise the power of veto should they consider the program to have gotten out of control. To date, they have found it unnecessary to do so.

In an ongoing program to better serve managerial personnel with usable, timely and accurate information, Bank of Boston is also in the

process of establishing information centers in user areas to provide fast turnaround answers to information requests or produce management reports.

The first information center was established within the ISS division itself, where programmers, using a high-level query language (Focus), can tap mainframe data bases to quickly produce management reports from diverse application systems in response to management requests.

The next information center was established in the bank's credit department, where a small group of user personnel have been trained in the use of a query language/report writ-

'With the exception of our centralized secretarial centers . . . we have not needed to cost justify our user installations, thanks to user enthusiasm and support.'

er to answer management requests directly, either through their minicomputer or through it to mainframe files.

The ISS information center backs up the user information center as needed. Other potential user information centers are now being considered as a way to put users more di-

rectly in touch with corporate information data bases for fast turnaround of information requests, bypassing the need for programmer intervention (and lowering maintenance programming in the process).

Color graphics has recently been added as an additional visual information tool and expanded facilities will soon offer multicolor paper copy on the spot. (A picture is worth 1,000 printouts.)

The almost instant availability in one place of both in-house data and outside source material, coupled with the ability to manipulate it into an acceptable format, is viewed as a
(Continued on SR/14)



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(Continued from SR/13)

giant step toward giving decision makers the information they want and only the information they want instead of inundating them with mounds of paper.

We have only scratched the surface to date in terms of integrating both text and DP in a single device, but meanwhile we are providing the capacity in a single information center.

In addition to our information centers, we have today some 300 office system terminals and 75 printers tied to 12 central processing units serving 56 bank departments in four separate buildings in Boston.

Similar systems have been installed in Los Angeles and New York and in our European and South American

offices. Bank of Boston sees office systems spreading rapidly to those areas not yet on board, both domestic and overseas.

The telecommunications option currently available within our systems equipment permits us to communicate among our local departments with outside service bureaus and with our offices elsewhere in the country.

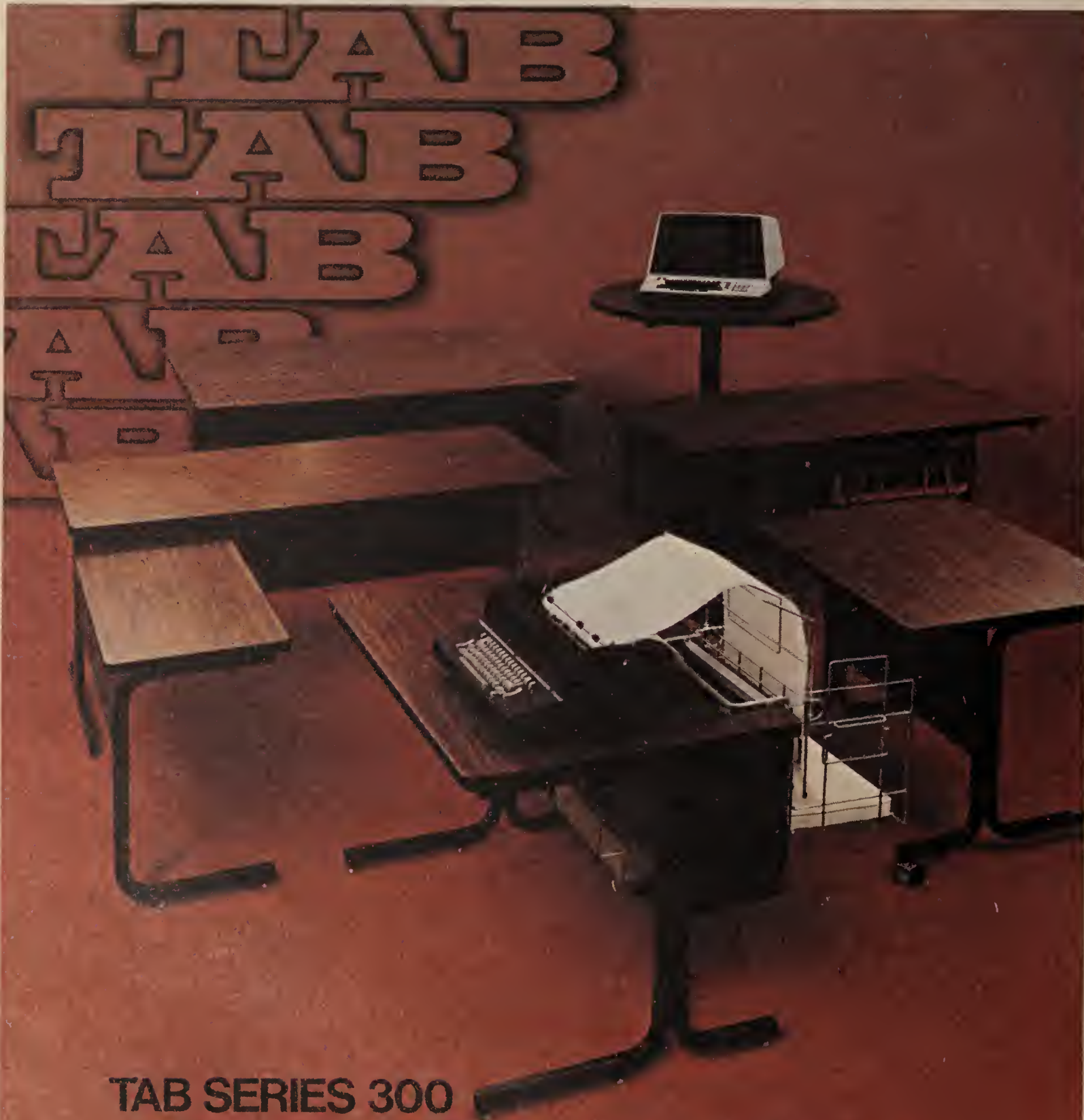
Although we have not yet identified widespread need for communications among all corporate entities, the capability is there should we choose to implement it.

To date we have focused most of our office systems energies on responding to urgent requests of users to get them up and running as soon as possible. However, Bank of Boston's office systems program encompasses a wide variety of other concepts.

Among these are research into and selection of graphics output devices, proliferation of query and report generator languages, personal/microcomputers where neither an office system nor a large-scale computer is appropriate, phototypesetting, electronic mail, voice message systems, optical character recognition devices, facsimile, teleconferencing techniques, combined text and data entry and integrated text and DP.

As we move forward with further integration of these and other office systems components, we believe we are achieving productivity improvement through office automation, not just for the clerical/secretarial staffs but, more importantly, for managers and executives where the real payoff in office automation lies.

Synott is a senior vice-president at the First National Bank of Boston.



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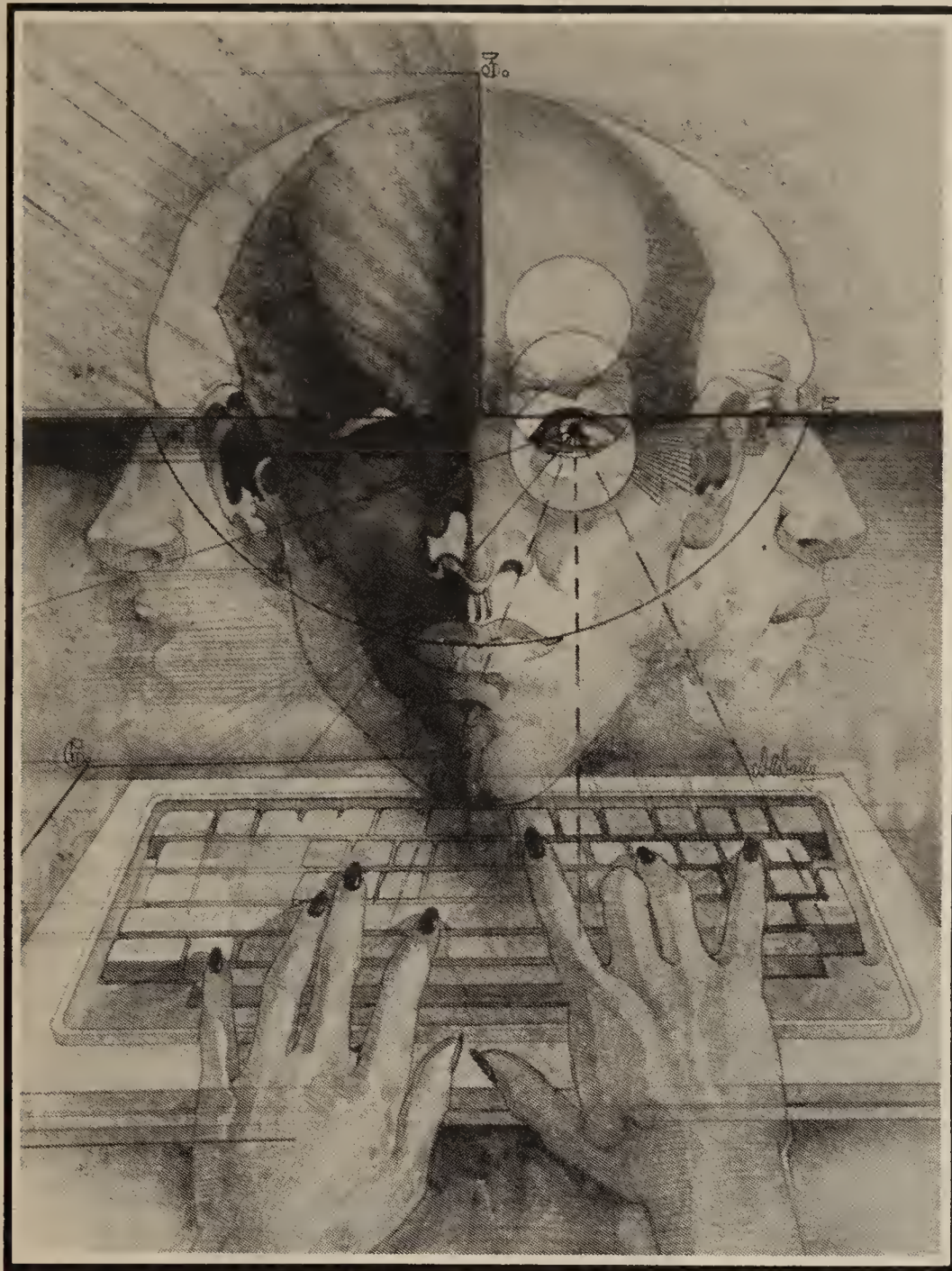


Illustration Courtesy of Sperry Univac

What Price Comfort? The CRT Terminal in the Office

By Marvin Dainoff
Special to CW

Lucy Z. is a data entry clerk in a large multinational corporation. She spends all of her working hours at the keyboard of a CRT terminal transcribing invoices.

At the end of the workday, Lucy's back and shoulders are in pain. Her eyes hurt, her wrists are sore and she is too tired to think about anything except spending the evening slumped in front of the TV. Lucy needs her job, but is seriously thinking about quitting.

Lucy is, of course, a fictitious character, but she typifies the problems of an increasing number of users of the fundamental component linking the human operator with automated office equipment — the CRT terminal. It is fairly safe to conclude that it will not be too many years until a significantly large proportion of the total population of the U.S. spends a significantly large proportion of their waking hours interacting with some sort of terminal.

Given this fact, it should be a matter of concern for all interested parties — vendors, purchasers and users — to attempt to understand the ergonomics or human factors relating to

the match — or mismatch — between physical dimensions and attributes of the CRT and its surrounding workplace with the physiological and psychological attributes and abilities of the human beings who must interact with the equipment.

However, the present state of the art is such that the link between identification of a problem and design solution is based on reasonable inferences, generalizations and judgments rather than precise scientific evidence.

There are now a number of studies indicating high levels of health complaints associated with work at certain CRT tasks. A large-scale study in Germany found that 85% of a group of data entry operators reported symptoms of eye fatigue; the comparative incidence for programmers was less than 50%. Similar results have been obtained from investigations in San Francisco and Stockholm.

Reports from studies in New Zealand, Zurich and the U.S. indicate that CRT clerical operators have higher level of eye strain and muscular complaints than do non-CRT using office workers, or "professional" (editors/programmers) CRT users.

Finally, experimental studies from Sweden and Austria indicate changes in visual function that are related to the number of hours of CRT work.

Sources of Complaints

There exists several potential sources of health complaints. These include the CRT itself, the workplace environment and the organization and structure of the task.

The CRT has several ergonomic attributes that make it different from traditional office equipment. The text is displayed in a vertical position with a glass cover that is typically highly reflective, hence glare from ambient lighting becomes an important problem. Moreover, the alphanumeric characters are usually formed from lighted dots against a dark background as compared with hard-copy print, which is the reverse.

The resulting symbols may not be as crisp and well-formed as those seen in normal typed copy. Finally, the display is not physically stable over time, but is continuously being refreshed. Under some conditions, these temporal variations are perceptible as flicker.

Any of these factors, individually or in combination, have the potentiality to overwork the visual system causing symptoms of visual fatigue. However, there is little data linking specific ergonomic attributes to specific symptom manifestations.

The work environment within which the CRT is placed can be an additional source of health complaints. Three areas that can be identified here are furniture, lighting and temperature/air conditioning.

It is well known that maintaining muscles in a fixed posture for prolonged periods of time results in high levels of fatigue. This is exacerbated if the posture is awkward, in the sense of not conforming to the inherent biomechanical structure of the body. However, these principles have often been ignored in procurement of furniture or CRT workplaces.

It is difficult to find office environments in which CRT keyboards and screens are at proper working heights and viewing distances, with adequate working surface space and with a sufficient range of flexibility to accommodate individuals whose bodily dimensions deviate from the

(Continued on SR/16)

(Continued from SR/15)
mythical "average."

A good example of such lack of flexibility is the use of a terminal with a nondetachable keyboard. Here, the operator is locked into a fixed viewing height and distance regardless of his physical dimensions or visual abilities/status. If the operator wears bifocals, he is likely to have a real problem since the height of the screen requires that the head be tilted backwards in order to use the near vision correction at the bottom of the lens.

The reflective characteristics of the CRT faceplate as well as the dot matrix mode of character generation present a problem for the design of lighting that is not normally found in traditional offices. For many years,

office lighting has proceeded on the "more is better" philosophy.

However, due to the white on dark nature of the characters, high levels of overall lighting will reduce the contrast between letter and background, making reading difficult. Moreover, this problem will be added to by the fact that the typical solution to office lighting — banks of overhead fluorescent fixtures — will tend to produce images directly reflected from the faceplate, further reducing contrast between letter and background.

With regard to temperature/air conditioning, the presence of large amounts of electronic equipment necessitate particularly large air conditioning demands. If this is accomplished without humidification, the

air may become excessively dry, possibly resulting in eye irritation for contact lens wearers.

The use to which the CRT is put is also a crucial determiner of the extent to which health complaints occur. To return to our friend Lucy for a moment, let us assume that her task involves a very simplified, highly repetitive data entry procedure and that she is under tight supervisory control requiring her to meet hourly production quotas as well as to obtain permission if she wants to leave her station.

If we compare Lucy to Eric the programmer, who works at his own pace and is free to wander around, it is reasonable to expect that health effects resulting from poor ergonomic design will be exacerbated by her job

demands. Simply put, Eric is in control of his workday to a greater extent than Lucy. He can get up and stretch and walk around if his eyes hurt and muscles start to ache. She cannot.

Lighting Crucial

Until more is known, one should be able to accomplish a lot by dealing with lighting, glare control and furniture adjustability. Task lighting should be provided so that illumination levels are adequate for reading hard copy, but not so high as to wash out the characters on the screen.

In particular, the relationship between screen, lighting fixtures and windows should be adjusted so that faceplate reflections are eliminated or minimized. An effective antiglare shield should be provided — either at the time of purchase or for retrofit.

Some authorities have indicated that eye strain may result from inadequate eye glasses. However, given that CRT screens tend to be located further away than the typical 13-in. reading distance, a new approach to prescribing corrective lenses for CRT operators may need to be developed by the vision care professionals.

In both CRT and accompanying furniture, adjustability must be provided. The terminal itself should have a detachable keyboard and a tiltable screen. The operator should be able to assume a working posture such that the forearms are able to be approximately parallel to the floor and the arms approximately vertical when the fingers rest on the home row of the keyboard. Screen viewing angle should be within a 10 to 20 degree range from the horizontal.

To accomplish these goals for the typical range of body dimension, adjustable office furniture, which allows independent adjustment of keyboard and screen, will likely be necessary. This type of furniture is now starting to appear on the market.

The importance of an ergonomically designed chair cannot be overemphasized. The chair should be easily adjustable in height so that the operator's feet can rest firmly on the floor. Adjustable back support should be provided so that the spine curves inward in the lumbar region, but outward in the region of the thorax.

Finally, the way in which CRT work is organized must be emphasized. Health symptoms can be effectively reduced by a work place atmosphere that allows each operator to take informal work breaks as he feels the need. Additional efforts to humanize CRT work through job redesign (that is, increasing variety and responsibility of tasks) are likely to be even more fruitful.

Several other important issues relating to human/equipment interactions include user-friendly software, the social impact of transitioning to office automation and the quality of working life in the "paperless office," all need to be treated in greater depth.

Dainoff is an associate professor at Miami University, Oxford, Ohio and is currently on a visiting appointment at the National Institute for Occupational Safety and Health in Cincinnati, Ohio.

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Office Automation: At Which Stage Are You?

By John Rhodes
Special to CW

There is general agreement that office automation needs to be managed, but few people agree on what office automation is, and even fewer know how or why to manage it.

Large companies have been adding "Office Automation Manager" to their personnel lists in the last two or three years. In smaller companies, "office automation" is being added to the management information systems (MIS) director's job charter.

The situation resembles the early days of DP, when brand new applications were being developed; the hardware had an aura of mystery and excitement and there was very little experienced management. Also, like the early days of DP, there is a dangerous hype for office automation: People talk about "slashing clerical costs" and about "integrated MIS systems" based on word processors. These benefits can be true, but they do not come easily or automatically.

A Staged Approach

The key to successfully introducing office automation is, first, careful preparation and, second, establishing clearly defined, limited, phased objectives. It is useful to think in terms of a basic number of stages.

In the first stage, the objective is to contain or reduce cost by improving repetitive clerical functions. The technology involved is fairly simple and management can be handled through normal office equipment purchasing functions. Most offices in the U.S. are at this stage.

In the second stage, the objective has moved beyond simple cost control to the improvement of administrative productivity and performance. For the first time, consideration is given to whole processes, not just single workstations. The office is viewed as a system. Administrative systems analysis techniques are applied to functions such as typing, filing and archiving, and functions such as a typist or a secretary may be redefined. The most important piece of equipment at this stage is the word processor.

The third stage is marked by efforts to manage information. The functions of the documents produced are analyzed; the ways they are distributed are improved and streamlined. Who needs what information, at what frequency, in what format?

There are perhaps two stages beyond this point. In the first, all information systems — DP, WP, graphics, voice and video — are integrated. Some pilots of this type exist. The final stage is still in the future and depends upon further technological development. It will probably include voice-driven input systems, true plain language programming, sophisticated communications and teleconferencing and unforeseen wonders for a new generation of advanced business applications.

Each stage is concerned with the introduction of a new technology. Stage 1 is primarily electromechanical and is based upon efficient ways of producing and storing words on paper. In Stage 2, word processing systems with magnetic storage

'For the first time, consideration is given to whole processes, not just single workstations. The office is viewed as a system. Administrative systems analysis techniques are applied to functions such as typing, filing and archiving, and functions such as a typist or a secretary may be redefined. The most important piece of equipment at this stage is the word processor.'

should replace much of the paper that now clogs the office.

In Stage 3, communications are wedded to office systems. The tremendous breakthroughs in cost, reli-

ability, flexibility and standardization in communications permit highly effective machine-to-machine communications at the office level. Electronic mail can now parallel dis-

tributed data processing. Advances in voice technology permit far more cost-effective uses of communications links.

Stage 4 links WP and DP, currently feasible from the hardware viewpoint, but requiring much more sophistication in data base technology than presently exists. And Stage 5 awaits improvements in voice recognition and plain language compilers and improvements in the economics of broad band communications for video transmission.

Managing Change

Each stage requires a different approach to management. In Stage 1, (Continued on SR/18)

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"IT PAYS TO HAVE THE RIGHT CONNECTIONS"

Stage	Primary Objective	Primary Type of Implementation
1 Introduction	Clerical cost containment	Use of electromechanical devices on a one-to-one basis to reduce/eliminate clerical activities (microfilming archives).
2 Multi-Functional Devices	Improve office productivity	Use of advanced electronic devices (word processors), again on a case-by-case basis.
3 Integrated Computer-Driven Systems	Improve management productivity	Develop techniques to speed up information movement (electronic mail) and information management.
4 Advanced Automated MIS	Directly support planning and decision processes	Implement integrated information systems (all necessary information can be assembled whenever needed.)
5 "Office of the Future"	To be determined; but includes: • Integration of inter-corporate processes. • Reduced need for personnel mobility.	

Figure 1. Office Automation Phases

(Continued from SR/17)

management should be primarily concerned with cost avoidance and cost reduction. A degree of oversight is necessary to ensure economies of scale and bulk purchasing. Central supervision of communications — such as mail and message — is important to maintain overall cost consciousness.

In Stage 2, the main tasks of management should be training and support. Corporate coordination of purchasing is necessary to ensure future communications compatibility, but heavy-handed standardization should be avoided. So, too, should be faction fighting between DP and office administration groups for control.

Wise managers of office automa-

tion, like wise managers of DP, encourage users to take control of the equipment. This leaves the managers free to concentrate on functional management, support, consultation

'Wise managers of office automation, like wise managers of DP, encourage users to take control of the equipment. This leaves the managers free to concentrate on functional management, support, consultation and standards to simplify communications.'

and standards to simplify communications.

Good management of Stage 2 also means easing the fear of change. Secretaries fear being demoted to word processing pools; managers fear or resent having to use keyboards. Helping to anticipate and ease these worries about changing work conditions can be critical.

Managing Stage 3 requires cooperative management of technology, particularly for the integration of telecommunications, and agreeing on the basis for managing information. Successful management requires combining end-user responsibility for automation with corporate responsibility for the supply of communications utilities.

In addition, because Stage 3 is involved with information, not just words or pictures, there are some sensitive issues to be managed. For example, we must determine the ownership of information and answer the questions "who must generate it, who must deliver it, who is accountable for accuracy, and — most difficult of all — who will pay for it?"

Stage 4 — fully integrated systems — has existed in military environments for many years, but offers few corporate examples. Stage 4 is concerned with full integration of all available information — usually to assist in the decision process. This, from a management point of view, enters the sensitive area of management functions, how decisions are made and on what information.

The most common cause of failure appears to be the old problem of

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'It's a Letter from My Son, the Computer Programmer.'

technology in search of a use. The most common cause of success appears to be the equally old but vitally important characteristics of good leadership, participation and support by top management.

Stage 5 still lies ahead. In the future, where do personal computers fit into the management process? Hopefully, beyond the clutches of the DP manager. At one firm we know, a senior systems person remarked, "The trouble with micros is that users want to use them." Management, or at least the professional systems people, should assist the introduction and ease the frustration of nonprogrammers in using personal computers.

If you are a typical Stage 1/Stage 2 company and want to move ahead on office automation:

- First, get user management — not technical management — to set objectives for office automation and get those built into the stated business plan of the corporation, based upon stated business priorities, such as reduced costs. The office is the most undercapitalized segment of American business, so some internal selling will be needed. However, of-

'Stage 5 still lies ahead. In the future, where do personal computers fit into the management process? Hopefully, beyond the clutches of the DP manager. At one firm . . . a senior systems person remarked, "The trouble with micros is that users want to use them."'

office automation projects often show excellent return on investment (ROI).

- Second, work through pilot implementations. Successful pilot users will do all the selling necessary. Pilots also have the advantages of limited risk and cost exposure, the opportunity to learn how to implement successfully and the opportunity to measure ROI before a major capital commitment is made.

- Third, introduce better ways of doing things, not just boxes. Make the boxes fit the environment, not vice versa. Concentrate on solving the human problems involved.

- Fourth, make heavy use of the users. It's their system. The biggest single factor for success is user commitment. Any experts involved should be limited to roles where specialist knowledge is genuinely needed, such as overall program planning and defining requirements and certain areas of technology — communications and information management.

Uses of History

Fortunately, in introducing office automation the history of DP provides for a valuable case study. There are obvious historical pitfalls to avoid, such as the overselling of grandiose integrated MIS; the benign neglect of communications as an integral component of a system; overconcentration on the technology and underconcentration on the business problems to be solved; corporate centralization/decentralization issues; the high cost of the "Not-

Invented-Here" syndrome.

There are also case studies of success: full visibility and participation by all parties within the context of a clearly defined and operating decision process, stage development controlling risk, analysis and design before implementation and the use of pilots.

As the use and acceptance of the technology matures, office automation will need to find answers to new problems.

But let us first solve the problems of today.

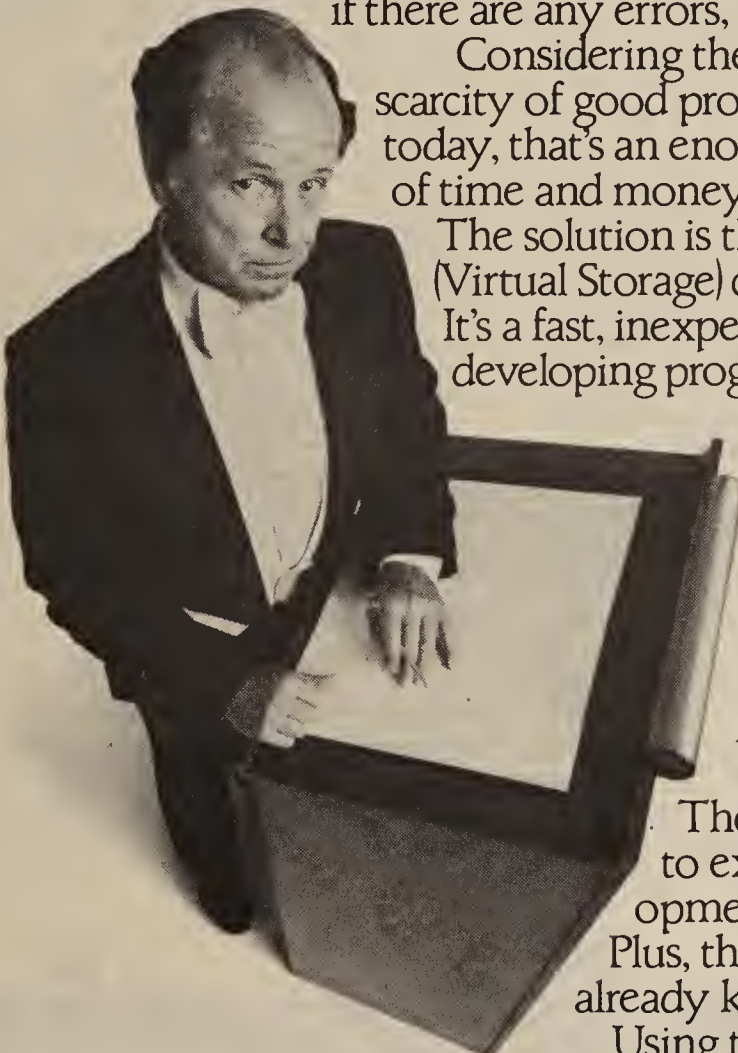
Rhodes is the founder of John Rhodes & Co., a management and systems consulting firm specializing in banking and financial institutions, located in Lyndhurst, N.J.

Stage	Primary Technology / Technological Objective	Examples of Types of Equipment
1 Introduction	Paper communications; paper storage objective is to reduce paper handling costs.	• Magnetic card typewriters • Plain paper copiers • Microfilm
2 Multi-Functional Devices	Paper communications; some nonpaper storage; objective is to limit the use of paper for storage and communications.	• Word processors • Advanced copiers • Advanced voice systems • Advanced office designs
3 Integrated Computer-Driven Systems	Electronic storage and communications; objective is to integrate communications into discrete office systems.	• Communicating WP • Electronic Mail • Some integration of WP and DP • Digitized voice system • Distribution of personal computers
4 Advanced Automated MIS	Multiple media; objective is to make all forms of information (graphics) available on-line.	• Full integration of WP and DP • "War room" decision support • Significant use of remote video • Elimination of most paper flows
5 "Office-of-the Future"	Objectives include electronic substitutes for travel and elimination of computer "programming."	• Voice-driven systems • Advanced video applications • Plain language programming

Figure 2. Office Technologies

Do your programmers need a reservation to use the computer?

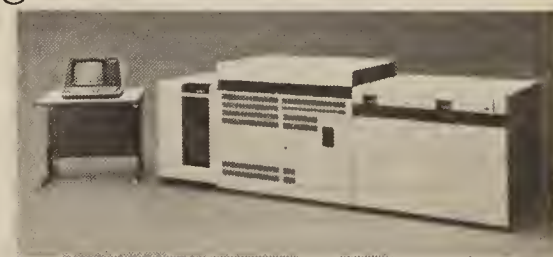
If you're using a mainframe computer, you know the problems your programmers face. Too often, they have to wait in line to get to the computer. When they finally get computer time, they're not even sure if their program will work. And if there are any errors, they have to go back to the end of the line.



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Is Office Automation the Best

NO

By James Driscoll

Special to CW

Should the office automation task force hardwire with Xerox Corp. or wait for IBM? How can corporate DP keep word processing from fouling its network? Should there be a terminal on every desk? If ever technology threatened to reshape the world of work, it is through office automation.

However, technology is not the sole determining factor. At every step in the development of office automation systems people are making choices. Yet despite empirical research showing the centrality of group interaction to organizational effectiveness, no one is choosing to design a group-based system.

Despite the cries for "end-user self-design" not one vendor has such a product line. Vendors seek to distinguish secretaries' terminals from executives' terminals by use of mahogany paint (pink and blue would be more direct) despite the overwhelmingly negative impact of status symbols on morale and productivity. No vendor is designing a boss/secretary module to minimize status differences.

After eight years of studying office automation — from word processing to electronic messaging — I see that at the end of office automation's present path it will cost too much money and will do more harm than good in a society seeking productivity, innovation and the best possible life

for its citizens.

Current technological innovation for the office has two emphases: increased support for key managers and professionals (typified by decision-support systems — DSS); and increased control over lower-level operators (typified by "true" office automation). At the top of the organization, DSS and the personal computer were designed to support the informational needs of key individuals.

Logic Reversed

At the bottom of the organization, the logic is reversed. True office automation incorporates as many organizational tasks as can be structured or programmed. The leftover work becomes a job for an individual. At the top of the organization, the computer supports the person; at the bottom, the person supports the computer. The ultimate consequence is an organization with "bosses" at the top and "computer garbage collectors" at the bottom.

The biggest barrier to productivity and innovation in the U.S. today is such separation: the separation of thinking work from doing work, the proliferation of managers and professionals whose job it is to "think" and the demeaning status differentials — in pay, benefits, hours, title and so on — created to remind other workers that they are not thinkers but doers.

Although computers did not create

current hierarchical organizations, increased social separation is one force driving current technological choices. Certainly office automation is not driven by economic rationality. Rarely, if ever, can end users show economic benefit after the installation of an office automation system.

Whenever I make this assertion somebody promises me post-hoc cost-justification studies. (I insert the "if ever" in case any of the hundreds I have been promised ever show up. We found none in a review of nine large users.) Instead, users talk of "enhanced services" or how "we couldn't live without the system" — tolerable sentiments, but quite different from the savings always projected by the vendor.

Equally certainly, social considerations do not drive office automation. Despite the potential of computerization to enhance the quality of work life, for most people office automation has meant increased stress, reduced opportunity for promotion and less influence over decision making. While better empirical research is needed to document these costs, the direction of the effect is clear.

Humanistic Technology

An alternative technological path could lead work organizations to increased productivity and an improved quality of work life. Such a path would follow different sign-

posts in systems design and implementation:

- Optimism about human nature. Current innovation assumes that most people are lazy and untrustworthy. Therefore, office automation systems seek to reduce skill requirements for most workers while providing information to a few key decision makers. Alternatively, an office automation system could emphasize feedback to the operators in order to develop their skills. The widely anticipated notion of a "self-designed" system would allow even "low-status" employees to program new tasks and redesign their own jobs.

- Systems for groups. In our individualistic, competitive culture, the vendors are preparing individual workstations or personal computers. Unfortunately, corporations require more work by groups. Increasing specialization, competition and the rate of environmental change imply group office automation systems — with large displays and protocols for weighing and sequencing multiple commands.

- Operators/users as clients. Smart vendors sell products that appeal to top management. Consequently, vendors are designing systems to appeal to top managers' desires for information, support and operational control. Unfortunately, top managers won't use much office automation and the true user, namely the

(Continued on SR/22)

How to begin a Lo



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Darned Thing You've Ever Seen?

MAYBE

By Steven M. Abraham
Special to CW

The "office of the future" is being widely touted as the technological solution to the white-collar productivity problem.

It is estimated that 1.5 million out of 3.5 million total offices in the U.S. are considered large enough to be impacted in a major way by office automation. Additionally, organizations that expect to have a favorable competitive and economic position in the coming years must take advantage of automation.

The use of automated office technology could have an impact on the white-collar worker comparable to that caused by the introduction of the assembly line for blue-collar workers, affecting not only productivity, but also role models, job satisfaction, the manner in which the office operates, leadership, management styles and even the quality of life.

At this time, the office of the future has yet to materialize in most organizations. Almost all efforts at introducing office automation technology have been directed at improving the productivity of the clerical and typing staff rather than that of the principal or knowledge worker. Such efforts concentrate on automating highly structured tasks.

Although many of these efforts have been fruitful, productivity gains in the typing area account for only 1.2% of U.S. white-collar busi-

ness costs. However, in 1979 an estimated \$50 billion was spent on purchasing information resources for clerical workers, while only \$24 billion was spent on principals.

Yet three-fourths (\$465 billion) goes toward paying the salaries of the principal. This is more than three times the \$135 billion spent on clerical workers. So, why then, when improving the productivity of the principal could potentially have such a major impact has progress been so slow in introducing automated technology to the knowledge worker?

Roadblocks to Progress

Management in many circles still resists office automation. There is a lack of trust on the part of some. People are clinging to old ways, partly because there is a lack of knowledge of the requirements for an automated office system and of the benefits that may be derived. This is especially true in organizations that have little or no experience with office automation.

Many organizations are not aligned correctly to successfully introduce the technology. There is a communication gap (and sometimes a power struggle) between corporate planners, administrative managers and DP managers.

An even more compelling reason why office automation technology for the principal is not seeing widespread use is that it requires a high investment. With today's capital-

tight economy, an investment must be justified based on its expected effect on organizational performance. Unfortunately, it is quite difficult to quantify the impact of this technology on the productivity of the principal and of the organization. Automated office systems can have a pervasive favorable impact, but much of the impact on the principal can only be measured subjectively.

Communication Time

The manager spends anywhere from five and one half to eight hours a day communicating:

Meetings (scheduled and unscheduled) — three to four hours.

Generating and receiving written information — two to three hours.

Telephone calls — one half to one hour.

Similar results have been found for the professional.

The total time the principal spends on communication leaves little, if any time, for performing the important tasks that impact organizational performance: problem solving, analysis and so on. Although we are spending hundreds of billions of dollars a year on communications, conventional communications methods involve a certain amount of waste, delay and ineffectiveness.

Even a small improvement could amount to large dollar savings. In fact, a 5% improvement in the productivity of communications would provide a cost savings greater than

the total amount spent on typing.

The word processing systems that are so popular right now certainly can improve the productivity of the clerical worker or typist, but no substantial gains from such systems can be expected for the principal since they do not adequately support the semistructured and unstructured activities that consume the bulk of the principal's time.

For an automated office system to be accepted on a grand scale, it must be designed with the requirements of both the organization and the principal in mind. First and foremost, human factors must be taken into account if office automation technology is to have the positive impact and widespread acceptance that is hoped for.

How the entire office functions as an information system must be understood if the automated office system is to really help. Pilot projects must pay careful attention to understanding how each office operates by looking at how people spend their time and how information flows in the office. When studying the office, one must look at procedures or processes rather than at individual tasks, since procedures provide a framework for the tasks comprising an activity. The focus of attention in the automated office system should be on reaching the end goals of a business for example, by allowing the principal to make better decisions or

(Continued on SR/23)

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(Continued from SR/20)

operator, will resist such control-oriented systems.

Strikes and walkouts by office workers have already occurred. An alternative strategy would be to define the client to include a large number of "low-level" operators and develop systems to enhance their quality of work life. Several efforts to involve operators in the early phases of systems design are under way in Scandinavia.

- Integration as a guiding principle. Office automation accentuates the separation between thinkers and doers in U.S. organizations by catering to the "thinkers." A more effective principle would be integration, in order to motivate doers to think and thinkers to learn effective action.

Pressure is mounting for a more humanistic technology from office workers and their representatives in government, labor unions and the women's movement. How much and how soon such pressure will force managers down a humanistic technological path — either out of fear of reprisals or out of the desire to re-

spond to legitimate worker desires — is unclear. However, in the meantime there are several steps that enlightened management might take to minimize the shock of future adjustment.

- Review office equipment from a human factors perspective. In response to the demands of unionized workers and government regulations in Europe, U.S. vendors are preparing more operator-sensitive equipment with respect to lighting, posture, noise and heat. The intended location of such equipment should also be assessed for suitability to the particular needs of CRT operation.

- Post audit office equipment.

Tighter evaluations would benefit humanistic systems. Presently dehumanizing systems flourish where managers pick equipment simply to maximize their prerogatives and power. Productivity, by contrast, will improve where office automation taps into the creative potential and task-motivation of office workers.

- Humanize the office automation task force. Nearly all organizations with more than 1,000 members have a task force on the "office of the future." Rarely do such groups include behavioral scientists or the prospective hands-on operators of automated equipment. Early and substantial influence over technology must be

given to those interest groups.

The current technological path is geared to the secondary labor market where low-skill workers are employed at low wages on a transient (increasingly more part-time) basis. This market will always purchase equipment for low-level operators based on cost justification and will accept low labor productivity.

Market Sizes

This market will remain small (for example, word processing data service bureaus). By contrast, the primary labor market may well grow in the U.S. both in response to pressure from unions, government, the women's movement and in the quest for enhanced productivity through humanistic work design.

Large users such as the insurance companies that are in fear of unionization or worker disruption may well drop their present strategies of low wages and no promotion and offer union-like conditions as do large nonunion manufacturers at the present time.

A watershed in office automation will come if the vendors anticipate worker pressure and target users in the primary labor market with humanistic office automation systems. Failing such a shift worker resistance will be coupled with the economic disillusionment of managers to slow the race to the office of the future.

Driscoll is an assistant professor at the Sloan School of Management, MIT, Cambridge, Mass.

"The ultimate consequence [of office automation] is an organization with "bosses" at the top and "computer garbage collectors" at the bottom."

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(Continued from SR/21)

facilitating more effective organizational communication). In the past, the focus has been on the means to achieve those ends (for example, by automating the document preparation process).

There are many positive impacts on the productivity of the principal that can result from the introduction of an automated office system. They come in the form of tangible benefits — those which can be quantified — and intangible benefits — those that are subjective in nature and are therefore difficult to measure and analyze.

Tangible benefits generally save either time, labor or both. The result of such savings should be improved bottom line organizational performance.

These benefits include more task control; a decreased need for travel, for meetings and phone calls; elimination of steps in a procedure and other time-consuming activities, fewer conversions of information from one form to another and increased output.

Intangible benefits can also save

time or labor, but they have additional impact that are less susceptible to quantification. For example, how can the impact of increased satisfaction on the part of a manager be accurately measured?

Intangible benefits include improved regulation of time, greater

autonomy and job satisfaction among users, quicker and better decision making, more effective and timely communications and information and higher quality work.

The extent to which these benefits will occur will depend upon several key factors:

- How well the organization prepares for office automation by planning, studying office operations and carrying out detailed requirements analysis.
- How well the new technology is accepted by the people that must use it.
- How well the automated office system satisfies the system-level

characteristics described previously.

It is extremely important to understand which applications will have the highest "payoff" for a given type of principal. The table shows, for various automated office system application areas, the typical degree of impact (high, medium, low) for principals at three generic levels (executive, manager and professional). The impacts of office automation technology on the productivity of typists or clerks can be ascertained. Productivity gains for typists ranging from 200% to 400% have been reported and total administrative costs have been reduced as much as 15% as a direct result of office automation technology.

It is much more difficult to assess the impact of an automated office system on the productivity of principals because many of the benefits are intangible and are due to behavioral effects. In fact, there is no currently accepted theory and methodology for evaluating the impact of an automated office system on the overall productivity of an organization in general and principal in particular.

Information systems have secondary effects that can greatly impact work habits and patterns of communication. These effects can be hard to relate back to the system that caused them. The benefits should show up in the form of improved bottom line performance.

Abraham is a manager for the Los Angeles office of Price Waterhouse and Co's. Management Advisory Services.

	Executive	Manager	Professional
Electronic Mail	High	High	Medium
Information Management	Low	Medium	High
Decision Support Systems	High	Medium	Low
Document Creation	Low	Medium	High
Personal Office Aids	High	Medium	Medium
Project Management Aids	Low	High	Low
Forms and Transaction Processing	Low	Low	Low
Automated Procedures	Low	Low	Medium

Impact of Automated Office System Applications on Principals

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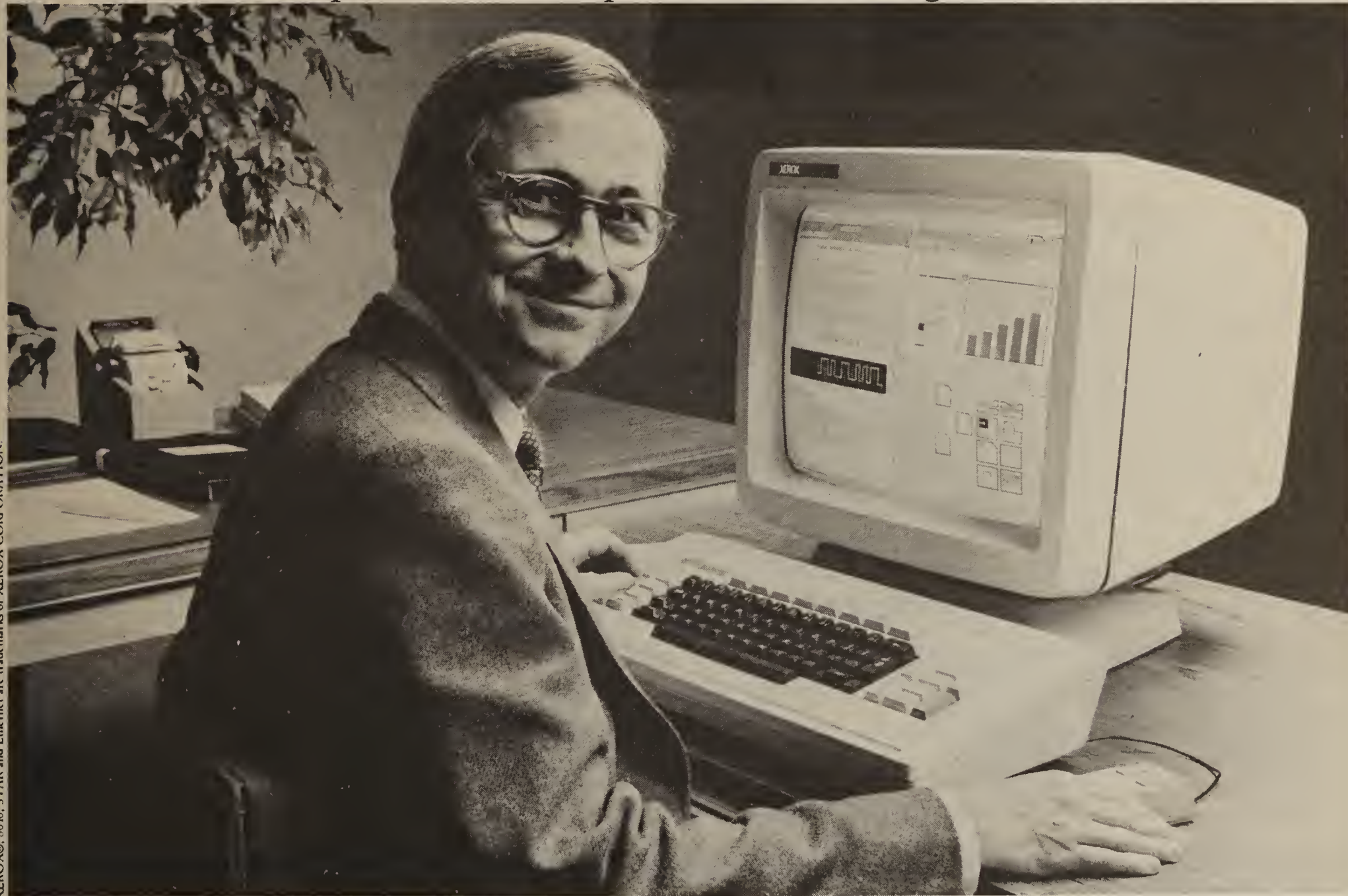
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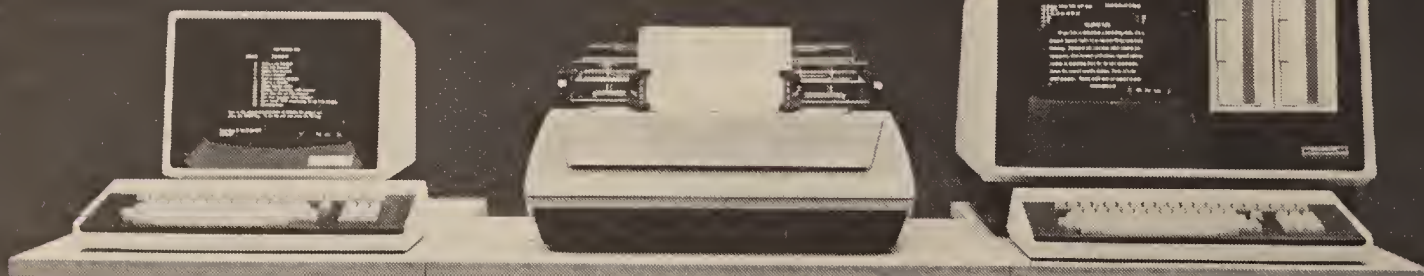
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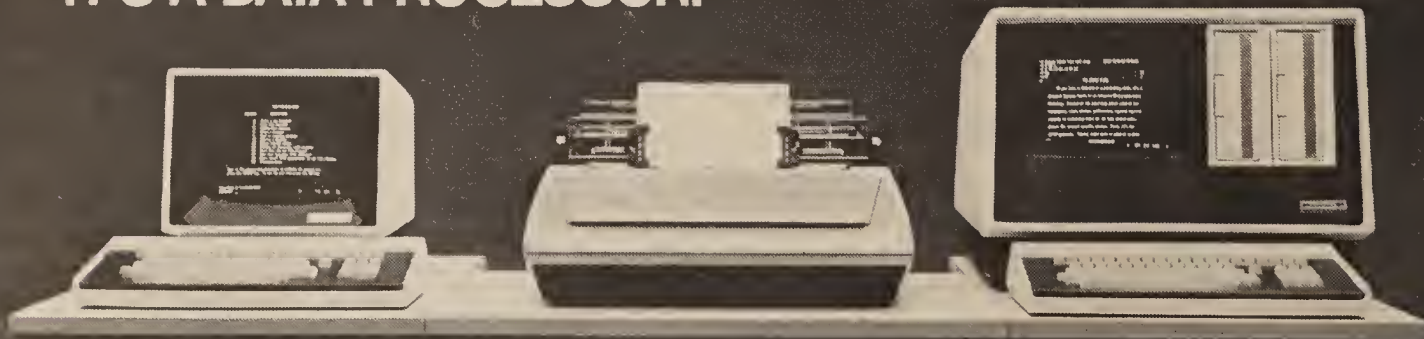
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By Huntley Miller
Special to CW

Even as it offers users time and cost savings, teleconferencing may also be ushering in the "global village," drawing organizations closer together through video and audio communications.

In 1979, corporations spent approximately \$290 billion on meetings, or 42% of their total expenditures on office communications. Over \$270 billion, including the costs of equipment, travel and people time, were associated with meetings to which at least one person traveled more than one mile, an event which occurred in two-thirds of the meetings. The bulk of that money, \$200 billion, was spent on a small portion of travel meetings that involved someone traveling distances greater than 350 miles.

In addition to high costs in terms of people, energy, unproductive time, the inconvenience of travel and difficult scheduling all are contributing to the push for teleconferencing.

Teleconferencing is defined as three or more people from two or more locations communicating electronically. It can occur in three modes:

- Audio; voice only.
- Audio graphics; voice plus the transmission of visuals, text, interactive writing and/or still images.
- Full motion video; voice plus moving images.

At AT&T, we studied people's current travel meeting behavior to determine what kind of meetings could best take advantage of the benefits of teleconferencing.

Meeting Activities

The type of activities that occur in meetings are: presenting reports (11%), providing status (16%), sharing information (35%), convincing (9%), negotiating (8%) and solving conflicts (20%). Sixty percent of the meetings are intracompany, while the remainder take place among two or more organizations.

Meetings that are the most suitable for substitution involve people who already know each other and those that are low in conflict, such as project review meetings. Other types are training, ad hoc program solving, briefing and policy dissemination and emergency communication. However, all traveling would not stop since only 50% of travel meetings were found to be suitable for teleconferencing.

Audio Meetings Only

Of the meetings that teleconferencing can replace, 80% can be held by audio and audiographic means. For example, monthly sales meetings are held in New York City, which require company personnel to travel from Philadelphia and San Francisco.

Holding this meeting via audio teleconferencing, conferees in Philadelphia and San Francisco would hear the presentation and participate in the discussion, yet not see the materials unless they had been sent out ahead of time.

Because people concentrate harder in an audio teleconference than in a face-to-face meeting to assimilate the information, teleconference tends to be more rigid and somewhat tiring. On the other hand, they are shorter

and more to the point. People can turn that time savings into productive work. The savings in travel expenses and time outweigh the negatives of audio teleconferencing.

Adding the transmission of visuals in real-time changes an audio meeting into an audiographic teleconference. The conferees in Philadelphia and San Francisco hear the presentation and see the materials that are being presented — vugraphs or slides — without seeing the speaker.

Having visuals on which to focus their attention, participants become less tired than in an audio teleconference. Audiographic teleconferences still tend to be shorter than face-to-face meetings because there are not the distractions of body language, facial expressions or side conversations.

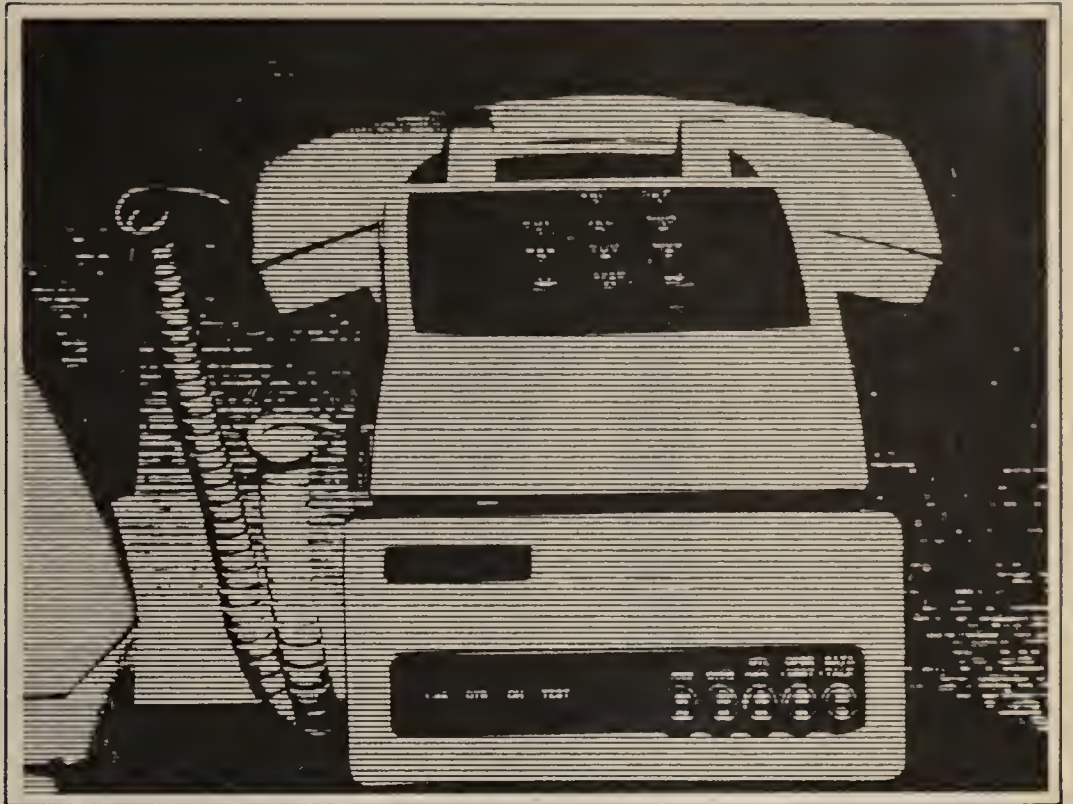
Users do not always have to see the

Faster decision making results from shorter decision intervals since face-to-face meetings, which are postponed because people's schedules do not allow them the time to travel, can be held quickly without regard for time or distance.

Quality of decisions improve, since people who otherwise would not have the time to travel to a meeting could attend remotely. Better coordination of management could occur since meetings would involve all the affected people. Managers can remain where they are needed, their talents shared and their time more efficiently allocated.

Corporations see improvements in productivity, cost control and management, while users see the personal gains in doing their job better.

Miller is a staff manager in office communications at AT&T.



'Having visuals on which to focus their attention, participants become less tired than in an audio teleconference.'

people with whom they are meeting in order to conduct business meetings, rather they need to hear them and see the materials being presented.

The remaining 20% of meetings potentially replaced by teleconferencing needs to be conducted over full motion video. There are times when people need to see body language and facial expressions of the people with whom they are talking, for example, meetings that involve persuasion or negotiation.

To be successful, teleconferencing systems must be as easy to use as the telephone and as natural as conducting meetings face-to-face. The equipment must be user-friendly and training will need to take place so that users can learn how to conduct teleconferences, use the equipment and manage meetings effectively.

When first using teleconferencing, meetings tend to be rigid and awkward because people lack some visual cues and are unsure when to contribute to the discussion.

Having installed a teleconferencing system, users should track who uses it, which departments and for what purposes. Most users will not care where the capabilities are housed as long as the system works and is easy to use.

User's needs imply end-to-end compatibility of the system, which means coexistence with PBXs, networks, controllers and terminals. The system must be flexible to adapt and match the current and future needs of the organization.

Travel Dollars Saved

Success of a teleconferencing system can be evaluated by hard dollars saved in travel and value-added measures such as better information flow and faster decision making. Teleconferencing does not require a major change in work habits and user training is small compared with other types of office automation technologies. Traveling can always be used as a backup alternative to teleconferencing.

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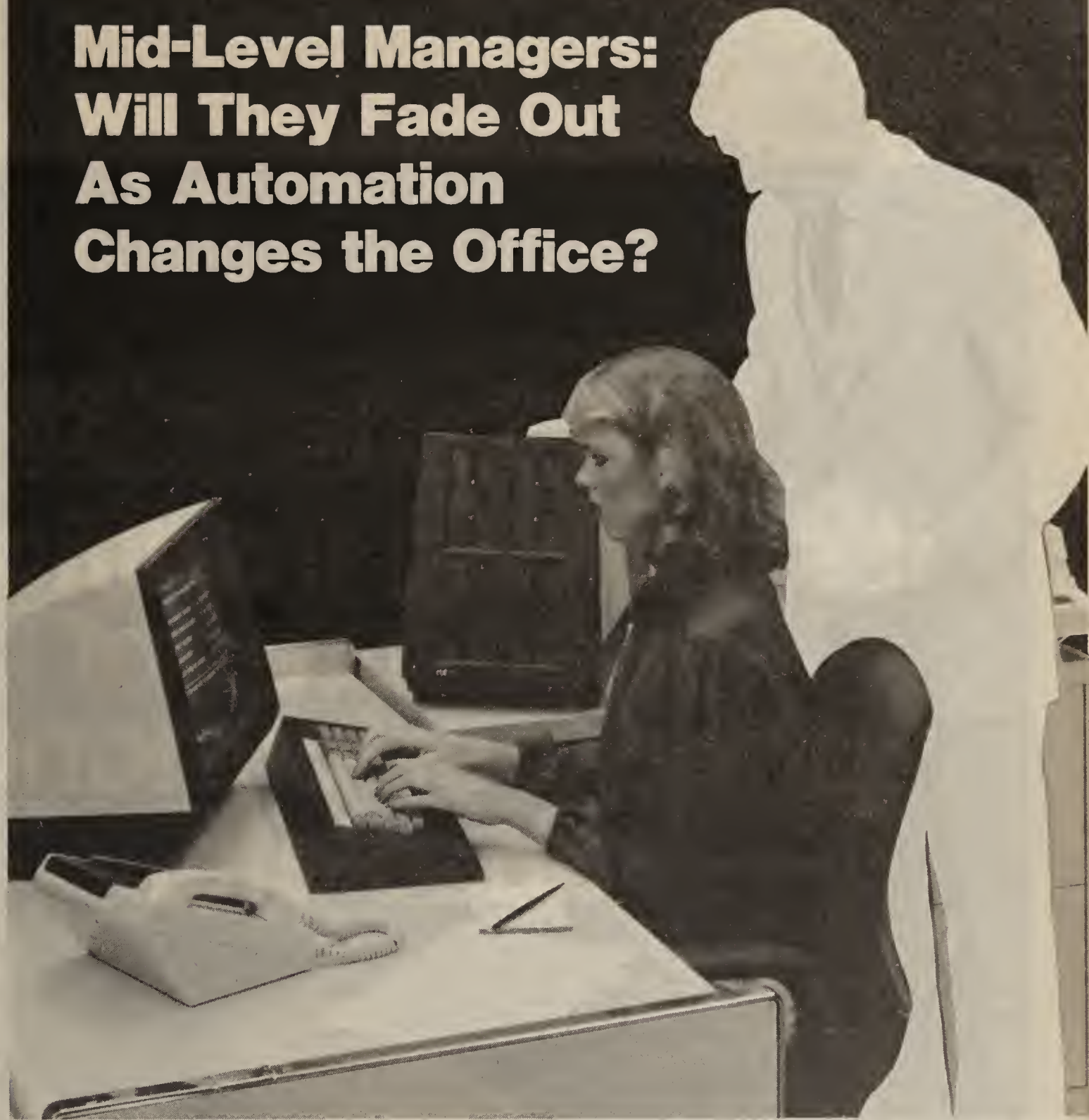
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Mid-Level Managers: Will They Fade Out As Automation Changes the Office?



By Philip Kraft
Special to CW

One of the things people in the computing business like to do most is tell each other how new and different their industry is.

One of the most popular variations on this theme is that computing offers an unprecedented opportunity to abolish routine and boring jobs and replace them with challenging and interesting work.

It is only a matter of time before we reach the promised land of maximum productivity, maximum profits and creative, happy workers.

While the industry has been thus reassuring itself about its uniqueness and potential, computing has rapidly approached its 40th birthday. In those 40 years some observers have noticed that computing is far from unique.

In fact, it has come to bear a striking resemblance to older — or what managers prefer to call mature — industries. Specifically, it has begun to create routine and drudgery where none existed before. Instead of creating skilled and happy workers, it has taken away skills and angered people who already had good jobs.

And computerization has already begun to threaten the jobs of managers.

Let us look at what is happening in this no longer young industry. As each new wave of technology is introduced, it is used to establish greater control over the production process.

The latest and certainly the most familiar attempt to impose management control is the effort promoting the "office of the future." When stripped to its essentials, the effort to create the office of the future is no more than an attempt to make the office of the present look like the factory of the past.

Specifically, this means that office jobs that involved a number of different but related tasks have been broken down into separate components. These, in turn, are par-

(Continued on SR/32)

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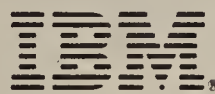


"The System/38 has more than lived up to our expectations. It certainly is faster, it certainly is much more responsive. We can do analytical work which heretofore was not possible. We can write interactive programs in minutes using the data base. We write less down, do less checking, but our working speed is up."

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General Systems Division



'Looks Like the Industry Shake-Out Has Started.'

(Continued from SR/29)
 celed out to separate workers, who do only those simple, routine and standard jobs over and over again. This is white-collar factory work, but it is still factory work.

We have a rather more familiar example of how this process works. Some readers may be under the impression that McDonald's is a restaurant that employs service workers. Those readers are

mistaken. Each McDonald's is an exquisitely engineered, ruthlessly efficient, self-contained hamburger factory, peopled by industrial operatives paid at the legal minimum wage.

Raw materials are delivered to the docks in the rear, from where they are unloaded and processed on an assembly line until the finished product is delivered to the end users.

Of course, delivery is made

only after appropriate data about price, volume, time of delivery and so on are entered on what the customer believes is a cash register, but what is really a remote entry terminal.

The terminal not only encourages employee honesty — that is the nice way to put it — but also provides immediate inventory control, information on employee productivity, work load fluctuations and so on.

Profits, Control

What is happening in office work, fast-food chains, auto production — the model for all of this — and other industries, has happened for the same reasons and in surprisingly similar ways. Increasing profits mean increasing control, both of which have been sought by standardizing work and deskilling workers — any work, any workers.

In order to use these unskilled — cheaper — workers, discretion over the work process usually has to be taken away from the more skilled workers.

I assume that most managers reading this have mixed feelings about what I have described. On the one hand, managers are trained and hired to implement precisely the sort of deskilling and standardization I have been talking about. On the other hand, many managers may be uncomfortable turning skilled people into extensions of machines, especially given all the talk about the shortage of skilled workers.

Some managers may have also sensed another kind of problem.

Even if they have no particular objection to deskilling other people, they may suspect that there is less glory and less money and probably less chance for advancement in managing unskilled people than in managing skilled people.

What to do?

I want to make an outrageous suggestion, one which, nonetheless, I believe in completely: Join unions for managers.

I say this not merely out of an abstract commitment to unions — which I have — but because I have it on very good authority that middle-level managers are in for rough times. The authority is Franco de Benedetti, joint managing director of Olivetti Corp. De Benedetti agrees with my analysis of the impact of computerization and has applied it to, of all people, middle-level managers.

According to de Benedetti: "Standardization is the necessary prerequisite to the subsequent mechanization

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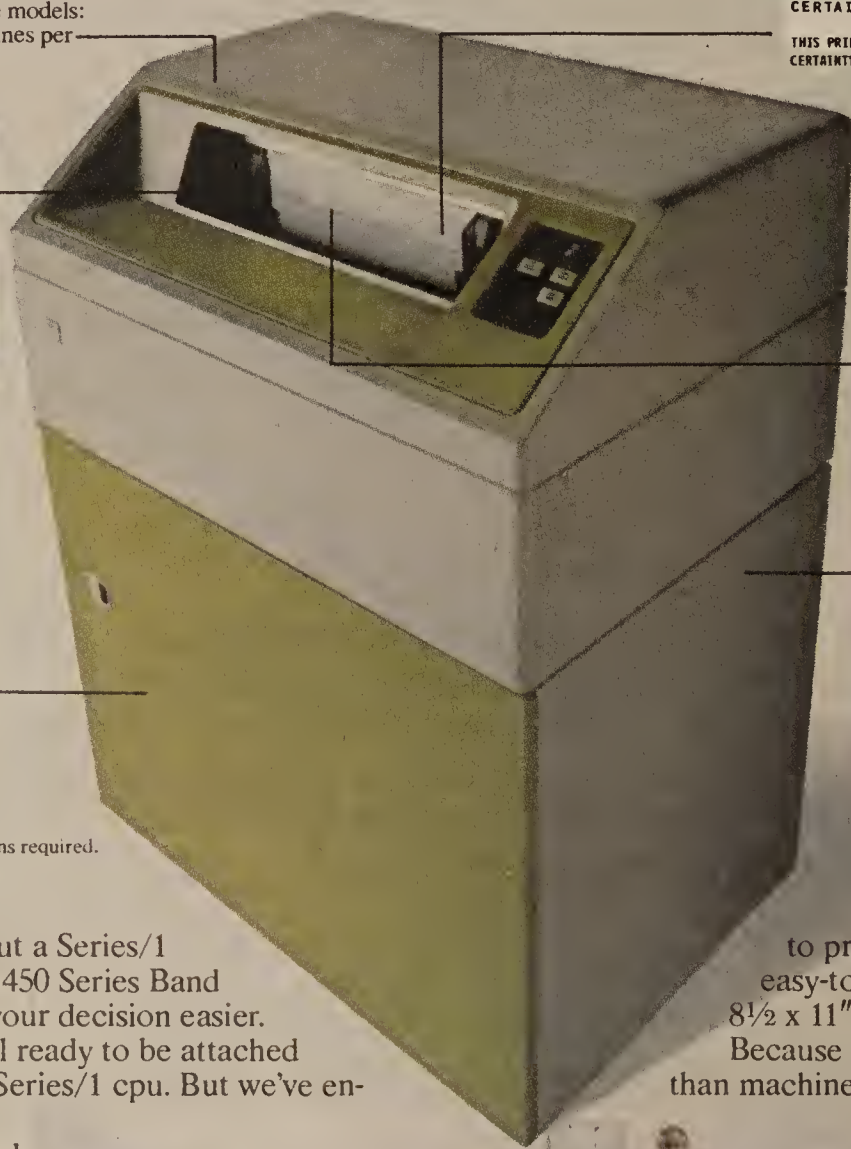
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and automation of productive processes... Data processing is a continuation of a story that began with the industrial revolution. It is basically a technology of coordination and control over a labor force, white-collar workers, which Taylorist organization [i.e., scientific management] does not cover. "In this sense, DP is in fact an organizational technology and, like the organization of labor, has a dual function as a productive force and a control tool for capital."

De Benedetti is blunt about the consequences of this "control tool for capital." It has spared no one. Clerks have been turned into machine tenders, while technical specialists, for example, programmers and air traffic controllers, have become "luxuries" no one can afford. And even managers are threatened.

"We have witnessed a shift from hierarchical structure toward polarization, with the elimination of intermediate groups and a centralization of decision making prejudicial to middle-level managers," de Benedetti stated.

Managers are being affected in the same way as clerical workers and hamburger servers — and for exactly the same reasons. Their work is being routinized, standardized and then given to machines, which are supervised by low-level, low-paid workers. We have all had first-hand experience with this process.

We no longer pay much attention to how we buy an airline ticket, change our insurance policy or place a catalog order. What we do is pick up the phone and talk to a ticket agent, clerk or order taker. Typically, each of them sits opposite a terminal and enters our reservation, policy change or purchase order.

Much more is going on than the automation of order

taking or clerical work. The same program that makes a reservation or takes a purchase order is also keeping a running tabulation on reservations, orders and policy changes.

It is also monitoring worker productivity and probably compiling an instant profile of sales trends, inventory movement and transaction values. In short, garden variety systems are now doing the things that managers

used to do. And these are simple systems.

Middle Level Expense

Middle-level managers represent an expense. Inevitably, their managers will seek ways to simplify, routinize, automate and eventually eliminate middle management jobs in order to cut costs. Allow me to stress the point. There is no reason why managers should be exempt from the same kinds of

"The latest and certainly the most familiar attempt to impose management control is the effort promoting the "office of the future.""

rationalization and cost-cutting techniques applied to clerks or machine tenders.

This is why middle-level managers will need to protect themselves. And this is why they will have to recog-

nize, more than they have so far, how closely their futures are tied to the people they manage.

Kraft is the author of Programmers and Managers: The Routinization of Computer Programming in the United States (Springer-Verlag, N.Y.). He is currently beginning a study at the University of Massachusetts/Boston on the subject of women in computing.

ASCII



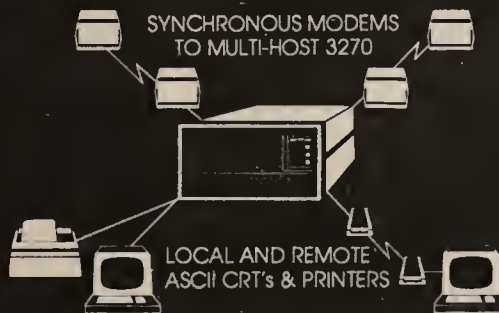
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Can't Be Assessed Yet Office Automation Market: Too New to Call

By Marcia Blumenthal
CW Staff

"In the Fortune 1,000 there are no more than 30 to 50 companies that are really serious about office automation, another 200 firms that are pretty active users of word processing and most of the remaining companies see the self-correcting typewriter as the wave of the future."

That assessment of the current state of affairs of office automation is the view of John F. Cunningham, executive vice-president of field operations at Wang Laboratories, Inc.

Although Wang and other major mainframers, mini makers and firms such as Xerox Corp. have introduced so-called integrated information systems, the office automation market is still in the very early stages of definition.

"People don't understand how they spend their office time or the value of office automation," offered David E. Liddle, vice-president and general manager of the Office Systems business unit of Xerox Corp. At the same time the life cycle of office automation products is very short — two to three years.

"The best users we talk to can only predict their office automation needs out 18 months," Liddle continued, adding that DP and telecommunications plans for the same companies could be planned on a five-year basis.

In the past, industry analysts talked about user acceptance of office automation as if it was a cultural phenomenon or a luxury, according to Liddle. With U.S. industry now under tremendous productivity pressure the real issue is how will companies implement office automation without interfering with the way people do their work.

And computer vendors are vying to offer those solutions, hoping to become early entrants into the office automation market, which is predicted to reach the \$15 billion annual revenue mark by the end of the decade, reflecting a 60% to 70% annual growth rate. Today the office automation market is estimated to produce annual revenues of about \$500 million.

Up to IBM

For this market to take off, IBM has to "get its act together," Wang's Cunningham noted. "We are operating under the assumption that IBM will be a big factor in this segment of the industry, getting a big chunk of the vanilla-type systems."

To date, IBM has not introduced an integrated office system, but its 5520 administrative system, Displaywriter and its text editing software are pointed in the direction of the office market, industry observers have noted.

Some vendors like Xerox and Wang

have already made significant inroads into the office through installations of their word processing units. Other vendors like Prime Computer, Inc. are approaching office automation through the DP backdoor, requiring users to commit to full-blown multifunction systems. IBM is expected to work through the DP infrastructure of the user organization.

Systems Business

However, despite their individual strategies, all vendors interviewed by *Computerworld* indicated office automation is becoming a systems business, requiring the provision of systems that perform at least word processing, electronic mail and data processing.

Xerox considers local area networks to be an important piece of its office automation strategy. Because these networks should be open rather than proprietary, Xerox intends to "publish what it takes to connect into the network," Liddle said. Besides its Ethernet network, Xerox considers the personal computer will play an important role in the office environment.

The firm's recent introductions of its 820 Information Processor personal computer and Star professional workstation attest to the firm's approach to the office automation market.

Office automation vendors cannot require major changes in DP software because users already have too big an investment in that software, so these vendors must accept the responsibility of making their products fit the user's established DP environment, he added.

A major problem is accessing mainframe text, Cunningham maintained. There is no problem integrating DP files on an office automation system, but vendors must be able to get their hooks on IBM 370 and Series 30 text processing packages.

Wang has hailed itself as a specialist in office automation. When its Wangnet local area network is installed, Cunningham said, users will be able to have the whole office automation gamut — video conferencing, voice, word processing, DP and electronic mail.

That full-capability system will be in beta test in two to three months, with deliveries beginning in late

1982, Cunningham said.

Wangnet is a broadband system, which can accommodate both voice, video and data transmission while Xerox's Ethernet network is a baseband system primarily for data transmission.

Prime is another early entrant in the office automation market, introducing its system in April 1980. To date, the firm has about 40 systems installed, with 25% operating as integrated office systems, according to Charles A. Khuen, marketing manager for office automation products.

"We don't have a \$10,000 word processing system. If a user wants a Prime system, they must be willing to commit a significant amount of money."

The firm is primarily selling to new users as opposed to adapting current Prime users to the office system. Prime is now working on incorporating voice capability into the system, he said.

In recent months both Honeywell, Inc. and Burroughs Corp. have launched their entries into the office automation arena.

Ofis 1 System

Burroughs' offering is the Ofis 1 system. The office file is the hub of that product, according to Roger W. Johnson, president of the Office Systems Group. "We are concentrating on getting information out of the computer instead of putting it in." To that end, Ofis 1 software allows the user to retrieve data on a content basis with the software searching for data in an unstructured manner.

Human engineering features such as touch and voice access as well as software that will do some deductive reasoning showing the user various relationships among data is a goal Burroughs has set for future office systems, Johnson explained.

Honeywell's Infowriter product is based upon the firm's DPS 6 products operating under GCOS, according to Dick Harris, director of field marketing for office automation. However, the firm has turned its DP systems around to be much more user friendly and text-based, Harris said, pointing to the system's ability to operate in IBM's System Network Architecture under SDLC.

"Anyone who can economically justify a \$6,595 intelligent device are our potential users," Harris noted.

Univac System Expected In Next Few Months

By Marcia Blumenthal
CW Staff

BLUE BELL, Pa. — Although Sperry Univac has yet to introduce an office automation system, the firm recently established an Office Information Systems Division and is expected to announce a product for that market within the next few months.

"We are the only major vendor not to have made an office system announcement, but we will not be dragged to market," advised Stuart J. Miller, vice-president and general manager of Univac's new division.

In part, DP managers who want to provide their users word processing, electronic mail and data processing capability on systems that are compatible with the host system are coaxing Univac into the market.

"Compatibility among office automation systems is a bigger issue than compatibility among DP systems," Miller maintained.

Major Issue

The major thing that has to be written is communications-oriented software and that is not as simple as it is made out to be. "It's difficult to make this software universal between all manufacturers," he remarked.

Moreover, selling office automation products requires the massive

retraining of a huge sales force and that is why mainframers have been cautious about entering this market.

Univac is working primarily with DP managers at customer installations to support their approaches to information handling. The firm has two pilot sites and is using its prototype internally, he said.

Despite approaching product specifications in conjunction with the DP department, Miller said Univac's approach will be entirely oriented to the actual office system end user.

In building its product, Univac has identified seven types of basic users of these systems and 16 kinds of information facilities. These seven types of users include three types of managers — managers of managers, professionals and clericals; professionals; administrative clericals; production clericals (those who perform order handling functions, for example); and typing pool clericals.

As for functionality, Univac sees an integrated system offering mail, message, word processing, computer access, videotext services, voice storage, dictation, image or graphics input and signature capabilities, among others.

Miller said Univac's first product will provide DP, word processing and electronic mail features.



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• *Prioritize Items*

Office of the Future Requires Careful Planning:

By Walter Ulrich
Special to CW

The office of the future is only beginning to arrive and already the economics are overwhelmingly in its favor. Organizations can no longer afford to wait to implement the electronic office.

There is a bewildering array of suppliers, products and approaches to the office of the future. Each has its own advantages and disadvantages, but in most cases, one choice is incompatible with the next. Conscientious planning, then, is all the more

important because a poor selection now may exclude a superior selection later.

Past management information systems (MIS) planning practices are not a good model for office systems planning. Traditionally, DP people have thought in terms of CPU power, memory, storage capacity, terminals and data communications controllers. Applications were justified on the basis of cost/benefit analysis.

The new office applications are being used by professionals and managers. Since professional productivi-

ty is harder to measure, the payoff is harder to quantify. There will be greater emphasis on personal computing and interpersonal communications. The mainframe computer will provide only a portion of the needed computational capability.

And yet, while the methods will be different, the concepts remain the same. Good planning requires an understanding of the current situation, a forecast of future needs and knowledge of the environment in which those future needs must be met.

Therefore, three basic information

elements are required:

- Current situations analysis.
- Future requirements.
- Environmental trends.

Based on these elements, the office automation strategy and plan is created. Office automation and its impact are too sweeping to be considered from a narrow viewpoint. The planning process, therefore, should look at the organization from a technical, organizational, cultural and business viewpoint.

Current Situation Analysis

The situation analysis provides a basis for measuring the organization's readiness for office automation. In going from point A to point B, you cannot expect to reach point B unless you know where A is.

One important part of the situation analysis is to take an inventory of existing information and communications systems. This includes everything from the DP center to the mailroom to the PABX to word processors and personal computers. What commitments and choices have already been made that limit future alternatives?

Other questions also need to be answered. How well is the company organized to take advantage of evolving information technology? Do voice and data communications report into the same department or are they widely separated? Are WP purchases coordinated or splintered? Does the chief information officer (CIO) have adequate organizational influence to monitor, control and develop the new information infrastructure?

How well is the organization's culture suited for office automation? Is innovative thinking encouraged or discouraged? Do new methods and ideas spring from staff departments, from leading-edge divisions or from the executive staff? What kinds of experiences has the organization had with technological innovation?

A very important issue is the current business situation. Is the business environment conducive to experimentation and implementation? Fortunately, information has been recognized as a critical asset in most medium- and large-scale organizations. The benefits of office automation are very real and examples of successful office automation experiments abound in almost every indus-



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Examine Office Culture, System's Impact First

try.

Understanding future requirements demands a knowledge of the corporate strategic plan. How big will the company be? How many locations will it have? How many employees will there be? Will the company be strongly centralized or decentralized? What kinds and lines of businesses will the company be in?

Clearly, a local manufacturer has different needs than a multinational conglomerate.

In meeting those strategic goals and objectives, how will the organization chart change? Very few organizations are static and competent planners are needed to project how that organization will evolve.

How much information processing will clerical, professional, administrative and management staff require? This kind of assessment takes large doses of knowing the company's business and its industry and, at the same time, having an appreciation for how new information services will impact the way work is being done.

Another part of the analysis is trying to project what competitors might be doing. If your company is already lagging behind one of your competitors, then their experience may be helpful.

Environmental Trends

Technology such as data networks, computer-based message systems, facsimile, baseband networks (like Ethernet), broadband networks (like Wangnet), voice/data PABXs and WP is rapidly evolving. There are too many bad choices that can be made, however, so that understanding technology trends is essential.

By evaluation we know where we are, where we want to be and what will be available to help us get there. Putting the plan together requires great judgment because there will be many paths that achieve the end result.

The overall office automation plan provides the impetus for drawing up more detailed short-term plans. Specific assignments are made and the results are carefully monitored. Steering committees have proved to be a way of generating guidance and cooperation. Nonetheless, one executive must have the authority to get the job done and be held accountable for the results.

Interim Steps

If you do not have an office automation plan in place, some interim steps can be taken so that short-term investments are not wasted. Two things that must be done on a short-term basis are:

- Standardize on a few products.
- Review purchase requisitions centrally.

By limiting new purchases to a small number of products, the proliferation of incompatible devices can be reduced. Commitments must be kept to short-term lease arrangements.

All equipment requests should pass for review through a central authority. Purchase decisions that can be postponed should be postponed.

As an interim step, system procurements should be carefully coordinated, monitored and controlled. The planning process must move quickly, however, so that needed equipment is not postponed too long, thereby frustrating users and adversely affecting productivity.

Office automation is happening everywhere. The benefits are so high and some of the equipment is so

cheap that it is being purchased in some companies disguised as office supplies. Without careful coordination and planning, companies will create insurmountable electronic Towers of Babel.

Pilot projects will be popular. However, pilots are a big investment in orientation and training and should be well thought out and carefully planned. It is always a waste of money to learn something from a pilot project that could have been learned had the necessary "homework" been done instead.

Without planning, office automation will be another technological white elephant, bringing chaos, confusion and frustration. Properly planned, office automation will increase and enhance the productivity of all employees. Information for everyone will be better; decisions will be made more accurately and quickly and communications will improve. Good planning will make the difference.

Ulrich is president of Walter E. Ulrich Consulting, a Houston-based management and technology consulting firm.

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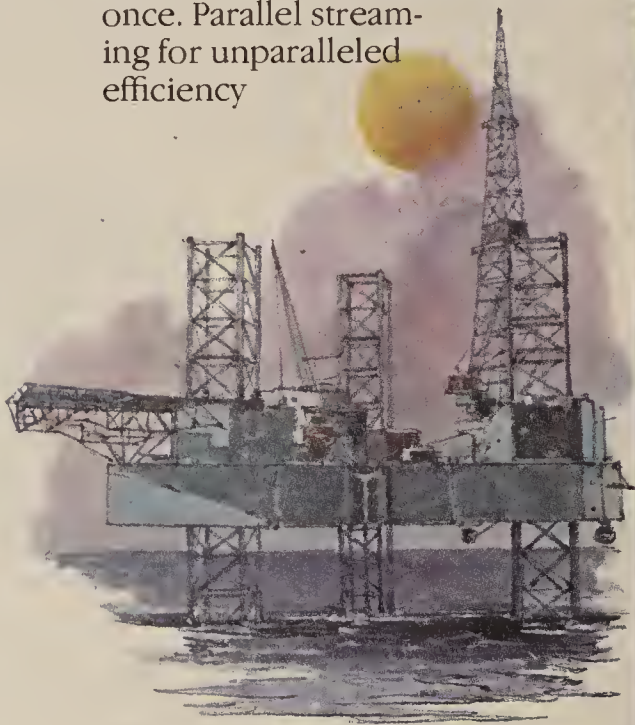
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Women Office Workers in a Race Against

By Karen Nussbaum
Special to CW

Women are on the front line of the new wave of automation. Clerical employment is the largest sector of the work force today and the Department of Labor predicts it will be the fastest-growing occupation in the 1980s. It is also increasingly female. In 1950, women comprised 62% of all clerical workers and by 1980, fully 80%.

According to the Bureau of Labor statistics, clerical work now employs 35% of America's 42 million working women. The occupations that are especially targeted for automation — file clerks, bookkeepers, secretaries and typists, bank tellers and insurance workers — are all at least 90% female. Already these jobs are being fundamentally changed by automation.

The particular effects of automation will depend on the nature of the job, the industry being computerized, management's intentions in restructuring jobs and the ability of office workers to influence the use of new technology in their own workplaces.

Businessmen frequently extol the virtues of the computer age in easing the drudgery usually found in America's offices. "Showcase examples" tend to ignore the effects of automation on the majority of clerical workers. By blurring the distinction between classes of employees, advocates give the impression that automation upgrades all jobs. This is a myth.

The vast majority of women office workers will have little chance to experience the potential benefits of computer technology. Most often, clericals work with computer terminals that have been strictly programmed to perform only one task and the worker must discipline herself to the requirements imposed by the machine.

One woman expressed the frustration of many office workers when she said: "I feel like asking my boss, 'What do you think I am — an extension of the machine?'"

Low-Level Jobs Same

Contrary to assertions that automation means better jobs, studies have found that the proportion of low-level clerical jobs tends to remain the same or increase with automation.

In many ways, automation also destroys the very aspects of work that most clerical workers enjoy — the variety within jobs, relations with coworkers and control over work style.

Whether inadvertently or by office design, modular workstations tend to break down interpersonal communication between employees and increase supervisory oversight. One CRT typist reported:

"I work at a terminal all day. When the union pushed the company where I work, they improved the colors and lighting and all that for the full-time operators.

"Now they have a new set-up called 'the open office.' There are panels six feet high around all the operators. We're divided into work groups of

four to six with a supervisor for each work group. In many cases, we don't see another person all day except for a 10-minute coffee break and lunchtime. All we see is the walls around us and sometimes the supervisor. The isolation is terrible."

Despite claims that soaring clerical wages are a major incentive for office automation, the average clerical salary hovers around \$9,000 a year, before deductions. In banking and insurance, among the most automated industries, wages for clericals are 8% to 19% below national averages by occupation, according to the Department of Labor.

Automation is contributing to lowering pay for clerical workers. In Atlanta, the average clerk/typist earns \$8,268, while the average CRT operator earns \$100 less. This is in spite of the fact that numerous studies show that secretarial productivity increases from 25% to 150% when word processing equipment is used.

New quotas greatly increase the speed and amount of work each employee must do, but few receive a penny more in pay as a result.

The computer era, it is sometimes said, offers vast opportunities for women. But women today remain concentrated in the lowest-paid com-

puter jobs as applications programmers and coders. Women account for only 19% of all computer specialists, but over 95% of keypunch operators and 75% of office machine operators.

One sociological study of five large employers in 1977 found that when automation was introduced, the proportion of low-level clerical jobs remained the same and that clericals were rarely upgraded or promoted to fill new skilled jobs.

The study found that the automated clerical jobs were more mechanical and narrow and that "the main avenues for clerical workers were either horizontal or downward." The con-

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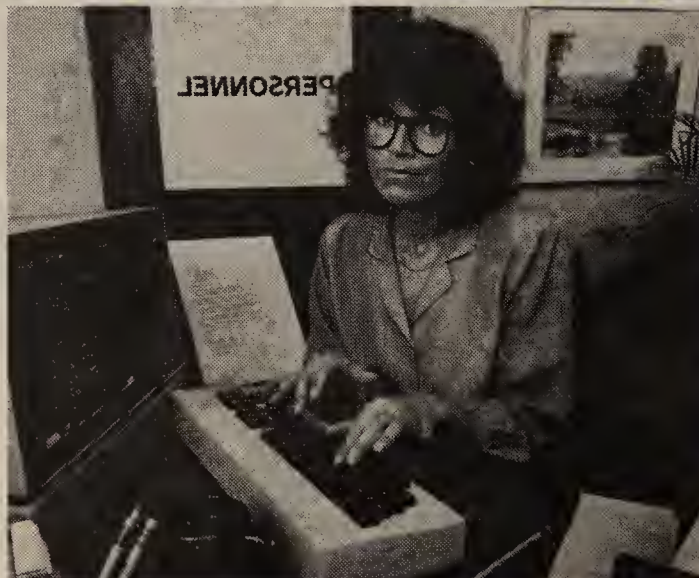
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Time as Automation Impacts the Work Place

ment of the majority of new jobs that result from office automation means an end to advancement opportunities once possible for clerks, typists and secretaries.

Evidence is mounting that new equipment being used and the way work is structured in the automated office pose serious hazards to the health of women clerical workers. Areas of greatest concern are occupational stress and video display terminals.

A comparative study of general clerical workers and CRT typists found that CRT typists experienced extreme fatigue, alienation, monoto-

ny and lack of challenge in their jobs at twice the rates of traditional clerical workers.

Symptoms of stress and increased job dissatisfaction were most prevalent among "computer-controlled" typists paid by piecework and "de-qualified" office workers who were transferred from more varied clerical jobs into full-time CRT work. The introduction of computers, CRTs and other microimage equipment intensifies the pace of office work in the name of productivity while increasing the monotony and boredom.

Recent studies link CRTs, the key units of office automation, to eye-

strain, migraine headaches, nausea, lower and upper back pain and occupational stress. Some 25% of secretarial workers who do conventional keyboard work suffer from severe muscular distress in the arms, neck and shoulders. The problems are significantly worse among CRT operators.

Studies indicate that increases in break time and redesign of jobs can ensure that a balance of traditional office tasks and computer work is maintained to relieve constant sitting and repetition. Unless occupational safety and health findings are taken into account, office automation

will integrate stress-causing factors directly and permanently into clerical jobs.

Potential for Improvement

Computer technology has the potential to create an improved quality of life and work. However, because automation is introduced within the context of highly competitive industries, it is controlled by companies



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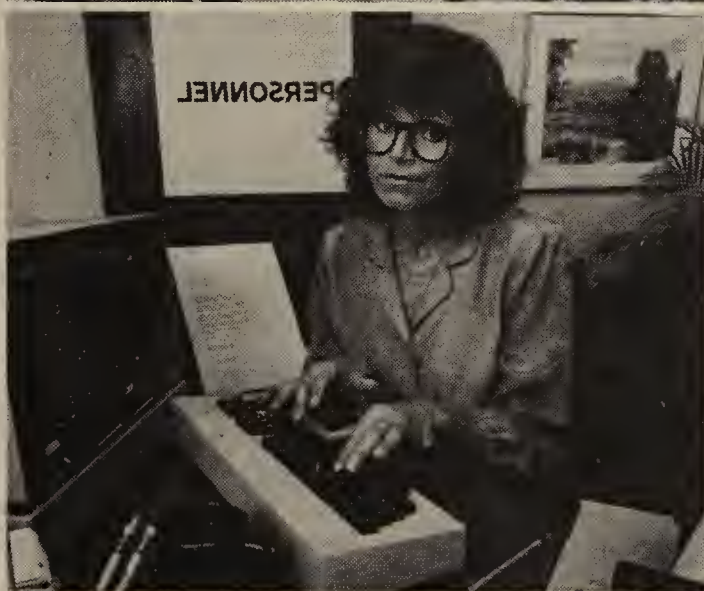
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whose primary motive is to ensure their own profitability rather than improving job design and occupational health and safety.

The jobs of employees at the low end of the pay scale are downgraded and devalued, despite the potential of technology to improve these jobs. It is inexcusable for employers to use the very technology that could genuinely upgrade clerical skills to abdicate the responsibility to train employees for better jobs while companies complain of the shortage of skilled personnel.

Women office workers are in a race against time. Unless automation can be genuinely improved in the '80s while the technology is still in its formative stages, the health and safety, quality of work life and fruitful employment of women office workers will be sacrificed in the name of progress.

Further data on the effects of office automation upon clerical workers can be found in: "Race Against Time: Automation of the Office" and "Warning: Health Hazards for Office Workers," available for \$4 each from Working Women Education Fund, 1224 Huron Road, Cleveland, Ohio 44115. Working Women is a national association of office workers with affiliates in 13 major cities and members in every state.

Nussbaum is executive director of Working Women Education Fund in Cleveland, Ohio.

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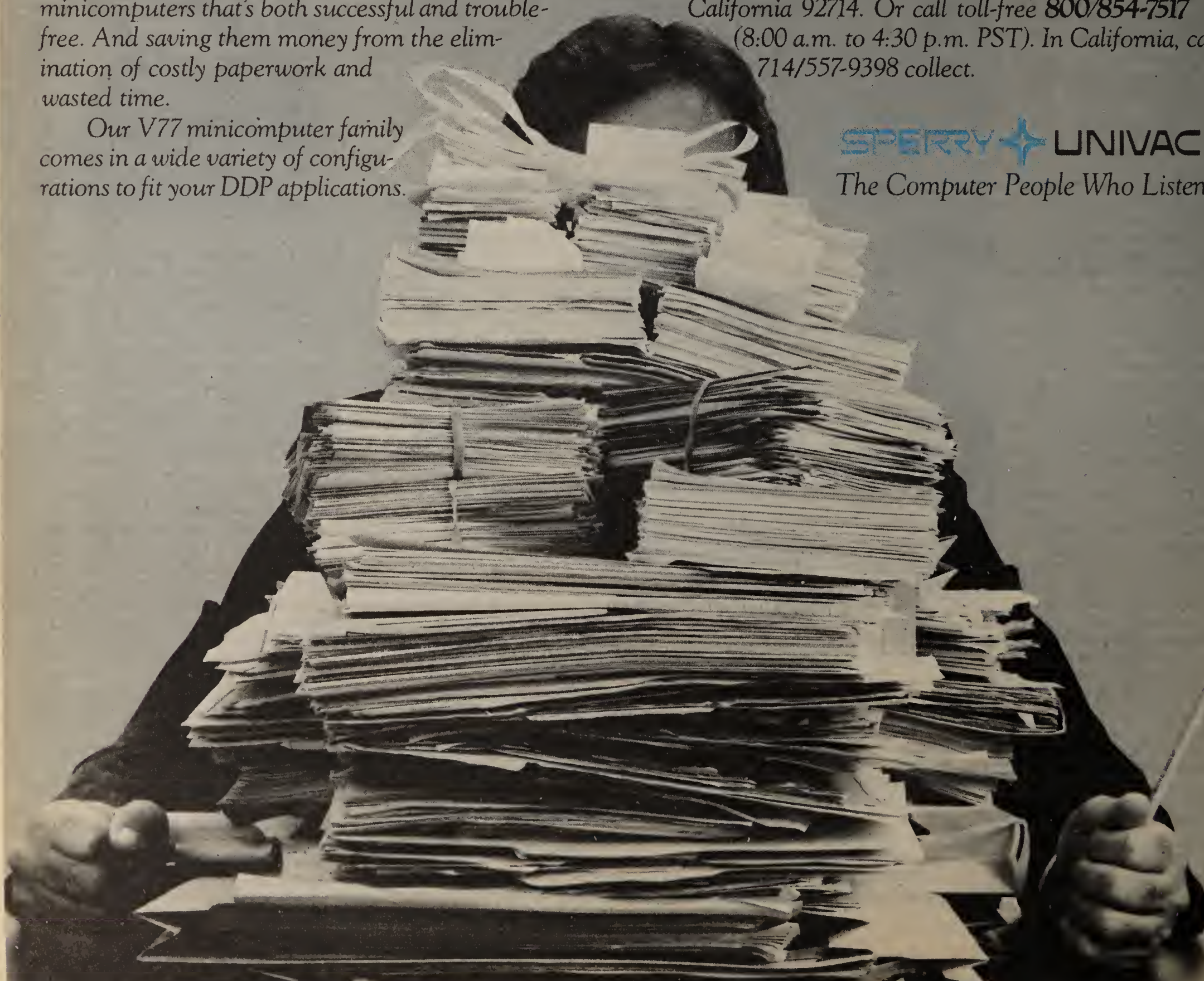
When it comes to information processing capabilities, Sperry Univac Mini-Computer Operations provides a distributed data processing (DDP) expertise you can't find anywhere else. What amounts to millions of dollars

Giving you instant file access and update, local information storage and processing, and flexible data communications capabilities between multiple sites and different computer equipment.

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SPERRY UNIVAC
The Computer People Who Listen.



No Longer DP's Domain

Firms Finding Graphics Essential to Office

By Alan Paller
Special to CW

Several times a week, Sandy Inscho walks over to a computer terminal in her office and types some lines, then goes back to her desk. One-half hour later, she walks over to a digital plotter and tears off a set of charts. She then takes the charts over to a machine that converts them into transparencies, thus concluding the task.

Sandy has just completed a job that used to require hours or days of delay. Later in the day, when the presenter comes back to her with the inevitable "that's nice; I just need a couple of changes," she can make those changes without leaving her office — and the quality is as high as she could get from outside graphics services.

A secretary in the Financial Planning Department at American Hoechst Corp. in Somerville, N.J., Sandy and 15 other secretaries at the company are on the leading edge of the revolution that will make graphics a standard component of the office of the future.

American Hoechst has plenty of company in the computer graphics field. International Data Corp., a Framingham, Mass.-based research firm, reports that more than 10,000 of the new IBM color graphics terminals were sold in 1980. The graphics software packages used by American Hoechst have already been installed on more than 800 computers, including computers in 28 of the 35 most profitable companies in the U.S.

Not all of these companies yet consider graphics a component of office automation, but the success of companies like American Hoechst will soon provide the justification to allow secretaries and managers to consider high-quality graphics a standard component of the office routine.

Graphics Taking Off

In the past 15 years, the price of a color plotter that can produce multicolor vugraphs and paper charts has dropped from more than \$40,000 to less than \$4,000. The new lower-cost devices can produce 10 to 20 charts in the same hour the old plotters needed to make just two to four charts.

Color terminals have had similar precipitous drops in price, with IBM and Digital Equipment Corp. both offering color terminals for less than \$4,000. In 1965, black-

and-white terminals cost more than \$100,000, and color was not even offered.

Hardware cost reductions would have little impact, however, without better software. Here, too, the vendors (IBM, Issco, Hewlett-Packard Co., Tektronix, Inc. and oth-

ers) have made major developments.

Graphics use has also been freed from the constraint imposed by programmers who were often too busy to provide potential users with flexibility and quality in charting. The new "user-

friendly" software can and is being used by secretaries, executives, graphic artists and others whose first introduction to computer technology was their use of computer graphics.

Because of the new easy-to-use, higher quality software,

and the new low-cost graphics equipment, the number of users is rising at least 60% per year, with as many as 40,000 new users being added in 1981 alone. Graphics are addictive because they add a new dimension to the
(Continued on SR/45)



1972 Bought first Optimedia cabinets to file remaining punch cards, 1316 disc packs and reels of 1600 BPI tape.



1975 Media changed to include 3336 packs in addition to tape. Cabinets reconfigured, new cabinets added.



1978 New system required 3348 disks but no tape. Manuals and run books added. Cabinets again adapted to needs.



1981 Optimedia usage has grown to include a wide variety of computer room media, systems and programming documentation and printout reports in all departments of the company. As media has changed, the Optimedia cabinets have been reconfigured to meet each new filing need.

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Because you don't know how your filing requirements may change in years ahead.

The days of single-purpose, soon-to-be-obsolete cabinets for D.P. records, documents and reports were struck a blow in 1972. That's the year Optimedia was introduced to computer rooms. Now these cabinets have become industry standards

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The MSI HandHeld Computers are the low-cost answer to your distributed data processing needs. Because our family of portable data-entry computers allows information to be recorded right at the point of action.

The programmable MSI HandHeld Computers can be hand-carried to wherever data needs to be gathered. Instead of recording information on a scratchpad or form, you simply key the data directly into the unit's solid state memory.

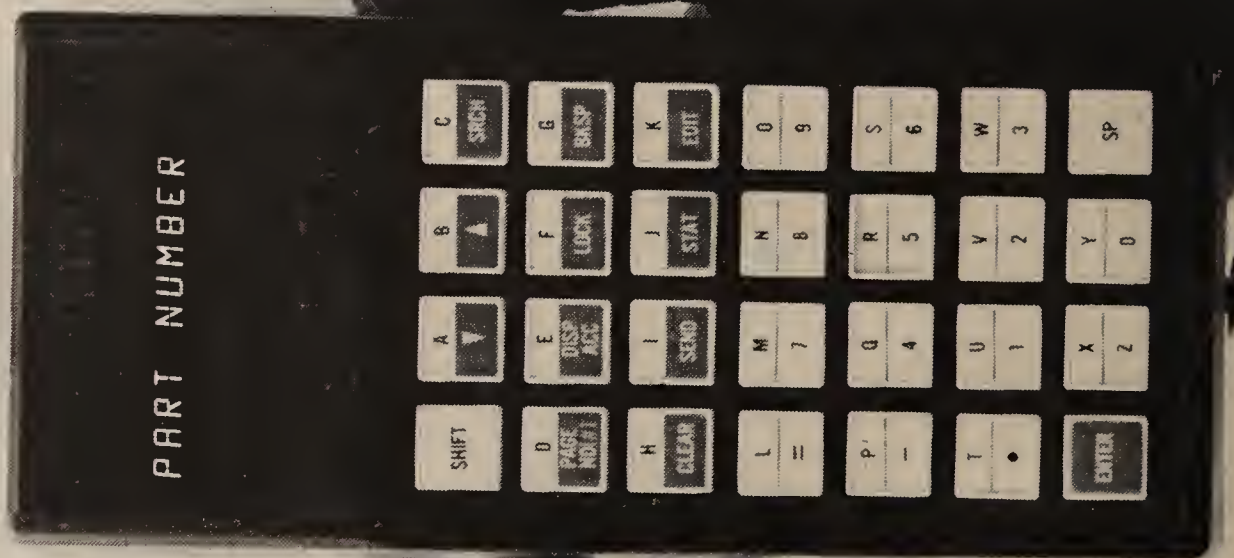
Then, at the end of the day, our battery-powered computer plugs into a telephone, and all the stored data automatically transfers over the phone into your central computer for immediate processing. Which means no more delivering the handwritten data to a central location, where it must be transcribed, and then keyed in on a stationary workstation.

Because our computers are microprocessor-based and user-programmable, they can instantly become highly specialized applications devices, for use in such areas as order entry, inventory control, financial reporting, manufacturing control, retail reporting, and field data collection. They provide functions such as data storage, prompting, error checking, editing, range checking, calculation, and more.

Thanks to MSI, field people become more productive, and information turnaround is significantly accelerated. MSI HandHeld Computers can result in a 30 to 60% reduction in data-gathering time. Which adds up to bottom-line cost savings. Not to mention happy top management.

MSI is the world leader in portable data-entry computers, with over 170,000 units delivered. And our global sales, service and support network will always be there to back you up. For more information, call us toll-free at 800-854-3024. (In California call 714-549-6375 collect.) Or write to MSI Data Corporation, 340 Fischer Ave., Costa Mesa, CA 92626.

We'll show you how to put DDP within easy reach.



MSI
DATA CORPORATION

We put computing in the palm of your hand.

(Continued from SR/43)

jobs of both secretaries and managers.

Because of the new easy-to-use, higher quality software, and the new low-cost graphics equipment, the number of users is rising at least 60% per year, with as many as 40,000 new users being added in 1981 alone. Graphics are addictive because they add a new dimension to the jobs of both secretaries and managers.

The most common application of computer graphics is financial monitoring. There are many others, though, that offer important contributions to organizational productivity, including performance monitoring, sales support, project management, financial monitoring and training.

Applications currently in use include executive presentations such as at General Motors where tables created on a Wang word processor system are transformed into 35mm slides through computer graphics in less than 30 minutes; marketing analysis in which Zip Coded data at large retailers is being converted into color maps; and regulatory review.

Traditionally, computer graphics in business have been the domain of the DP department, the graphics department or individual engineering and scientific users who acquired microcomputers with graphics capabilities.

Domain Change

Today, the people who need the charts done are taking over. They are demanding that the DP department stop forcing them to go through a programmer to get charts, and that the software has the flexibility and graphics quality to meet their real needs. If the DP department refuses, these people are acquiring their own small computers, or contracting with time-sharing firms.

As the users take over responsibility for their graphics, they are searching for methods of integrating this new capability into their office procedures. There are three pressures acting on the field that tend to push computer graphics and office automation together.

- Terminal proliferation in offices already means that WP and DP terminals coexist. Instead of separate graphics terminals, word/data processing terminals could give users access to shared graphics software and graphics hard-copy facilities.

- Data inconsistency and redundant data entry is a problem that arises whenever data stored on one machine has to be transferred manually to a second system. Since data is already stored on WP and DP systems, integration of graphics with those systems means the data is going to be identical.

- Management of final production of documents containing charts is difficult whenever the production of charts is outside the control of the people compiling and duplicating the document. When graphics production is available through the systems that produce the documents, the full demand for graphics in documents will be unleashed.

Graphics can be integrated with word processing either by adding graphics software to the microcomputers that currently support word

processing; by implementing an office automation software package on the same (larger) computer that graphics software can already be used on; or, finally, by using the communicating aspects of word processing to access larger computers where graphics software is available.

Three areas of development will shape the growth of graphics in office automation.

Laser printers, at significantly lower cost, will allow graphics and text to be integrated, as long as the quality of the software is sufficient to make the charts precisely what the user needs.

The large office automation vendors (and one major computer manu-

facturer not now thought to be an office automation vendor) will be announcing rudimentary graphics software that will introduce graphics to users of shared and stand-alone graphics devices.

Distributed processing networks will allow users of communicating office automation workstations to tap into large data bases, extract and graph data, produce a graph on a device attached to the workstation or send it, along with text, to a high-speed graphics/text printer for final production of documents.

Three actions related to graphics to be made immediately are:

- Expand your one- and five-year plans to include graphics equipment,


support and training.

- Experiment with available tools by adding a plotter to your communicating word processors and demonstrate the capability to manage them.

- Find a high payoff application and implement it so you can see what the real reaction is.

In the majority of pioneering user organizations, two errors were made that reduce the effectiveness of the graphics implementation unnecessarily. One was limiting user flexibility to get the right chart. Underestimating demand was the other area.

Paller is president of AUI Data Graphics in Washington, D.C.



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DATA COMMUNICATIONS

	Course #	Nov.	Dec.
CICS/VS Macro-level Applications Programming • Design, code and debug CICS/VS macro-level application programs • Invoke program, file, terminal and data management services • BMS input/output mapping	CICS01	9-13	7-11
CICS/VS Command-level Applications Programming • Design, code and debug CICS/VS command-level application programs • Invoke program, file, terminal and data management services • BMS input/output mapping	CICS02 CICS02 CICS02	2-6 9-13 16-20	7-11 11/30-12/4 14-18
CICS/VS Testing & Debugging • Use program dump to diagnose abends • Apply Trace, Dump and EDF facilities • Testing techniques for CICS/VS environment • Program testing and debugging workshop	CICS03	2-5	28-31
CICS/VS System Design • Design systems that utilize CICS/VS facilities effectively • Use program, file, terminal and data management services • Format screens using BMS and 3270 IDS facilities.	CICS04		14-17

DMS/CICS/VS Design and Programming • Generate on-line applications • Utilize supervisor and system functions • Code calculation, edit, control routines • Apply panel hierarchy techniques	DMS01 DMS01	9-12	11/30-12/3 21-24
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DATA MANAGEMENT

VSAM Coding for Higher Level Languages • Process VSAM files effectively via COBOL or PL/1 application programs • Load, read, update and extend key or entry-sequenced datasets • Use alternate index to process VSAM file	VSAM01	9-11	21-23
VSAM Using Access Method Services (AMS) • Design and implement VSAM file structures • Use AMS commands to manage VSAM catalogs, data space, datasets • Create and use alternate indexes • VSAM recovery procedures	VSAM02	16-20	14-18

DATA BASE TECHNOLOGY

DL/1 Applications Programming • Logical/Physical data base structures • Code DL/1 calls to retrieve, update, add or delete segments • Build segment search arguments • Process status codes • Establish data base position	DL01 DL01	16-18	11/30-12/2 7-9
IMS/VS Data Communications Programming • Describe IMS/VS message flow • Code DL/1 calls to send and receive single or segmented messages • Design and code conversational programs • Use batch message processing facility	IMS02 IMS02	19-20	3-4 10-11
IMS/VS On-line Message Formatting (MFS) • Create and use device formats • Create and use message input/output descriptors • Format screens using MFS and 3270 IDS facilities • Compile MFS source statements	IMS03	23-25	
DATA BASE DESIGN Principles and Procedures • Analyze data requirements • Describe logical data base design procedures • Define hierarchical, network, inverted file and relational DB structures	DB01	2-5	

PROGRAM & SYSTEM DEVELOPMENT

TSO/SPF Structured Programming Facility • Use TSO/SPF facilities to compile, execute, test and debug programs • Create, edit and manage datasets • Process jobs in background mode • Prepare and execute CLISTS	TS012		28-30
VM/CMS Conversational Monitor System • Use CMS commands to compile, execute and debug programs • Create/modify datasets via EDIT facility • Transmit and receive spooled datasets • Prepare and run EXEC procedures	CMS01		11/30-12/3
STRUCTURED Analysis and Design • Prepare feasibility study and system proposal • Develop system specifications • Implement top-down design and testing procedures • Use structured walkthroughs	SD01		7-11
ON-LINE Systems Design • Define on-line system requirements • Develop specifications and controls • Describe screen design procedures • Manage on-line files/data bases • Describe communication network components	SD02	23-25	14-16

PROJECT MANAGEMENT

MANAGING Systems Projects • Develop implementation plan • Schedule project flow • Assign project tasks • Estimate resource availability • Control and monitor system development • Prepare evaluation report	PM01	9-12	
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CMS01	SD01	SD02	PM01		

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Success of Office Automation Depends

By Ursula Connor
Special to CW

The success of office automation will depend not on the development of sophisticated technology, but on the manager's ability to gain user acceptance.

Managers need to be shown the big picture: how office automation will affect their people, what it will entail and what benefits will be derived for the company.

They need to understand the concepts behind word processing, information retrieval and electronic mail and how the new technologies will fit into their operations. Their observations as to anticipated problems and suggestions of better ways to use the technology are important.

Eliminate Fears

As machines replace human effort, people fear the change as well as their inability to understand the new technology. They fear depersonalization and this feeds their major concern of job security and income. People, just like corporations, have a very real and very necessary concern for their own "bottom line."

Do not keep your plans under wraps. After most of your managers have accepted the new concept, it is time for the first-line managers to begin selling the idea to the employees.

Managers should explain the concepts of the new technology, how it will affect the department's work and how it will benefit the employees. The more talk about the new methods before the system is in place, the more acceptable it becomes.

For the DP manager, who is trained in a logical, rational approach, selling the idea may seem unnecessarily time-consuming. However, when the non-DP's' comfort level is being shaken,

logic flies out the window and emotions take over.

Enhance Vendor Training

Effective use of office equipment requires:

- Gradual learning.
- Hands-on experience.
- Day-to-day technical assistance.

Every vendor of office

equipment supplies some form of training, whether in self-study packages, in formal class sessions or in one-to-one tutorials. These should be customized for your company.

To avoid the problem of too much information too soon in the learning process, the training materials should be

broken into modules of commonly used features and modules of advanced features.

The first training session should cover only the basic skills required to create, edit, store, retrieve and send information.

At least two weeks should be allowed for the user to

practice these new skills outside the learning environment. New equipment can be used in parallel with the old equipment and old methods.

After practice and some practical application, the second training session should be administered. This second step in training your users

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But today, Paradyne is much more than a modem company.

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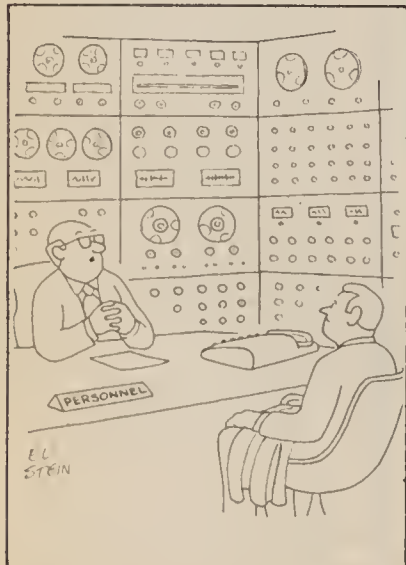
As the leader in using LSI and microprocessor technology in developing

modems, Paradyne produces a complete family of modems for operation at data rates of 1,200 to 16,000 bps.

Because we were also the first to use modems to measure line impairments, our ANALYSIS Network Management System offers features unique in the industry. In complex RJE, teleprocessing and distributed networks, ANALYSIS constantly monitors the status of all modems, telephone lines and terminal connections.



ANALYSIS: Network Management System



'Well, Thank You for Coming in for This Interview. Don't Telecommunicate With Me, I'll Telecommunicate With You.'



on User Acceptance, Not High Technology

should stress the information flow within your company — where the information comes from, where it goes and how it is used once it arrives at its destination.

This session should prompt the user to evaluate his own use of the equipment and to begin to notice where efficiencies are possible.

After this session, the new equipment should completely replace the old equipment and methods. For the die-hards who do not take to the change easily, an additional one-month period may be necessary.

Attention should be given to these holdouts to be sure that they understand how

the systems work and why the automated system must be used. This is best accomplished on a personal basis by the immediate supervisor or by the training instructor.

Third Session

At least a month should be allowed before the third training session, which

should focus on advanced features of the equipment with emphasis on some practical applications, takes place.

This last session should not only leave the learner with an understanding of the great potential for productivity, but should also stress the great potential for waste of

human resources, energy resources and supplies when the new technology is misused or abused.

Instructors for the first wave of training should have in-depth experience with both the hardware and software, since they will initially be considered the company experts.

As time progresses and the new systems become commonplace it will be unnecessary for the instructors to have a heavy systems background. Everyday usage will give supervisors and co-workers the necessary experience to answer questions and reinforce concepts for the newer users.

The last phase will occur every day on the job and is wholly dependent on the first-line manager or supervisor.

Managers must continue to look for new methods for efficiency and must encourage the employees in creative use of the equipment.

Redesign the Work

Once the early frustrations have been overcome and the machines are humming, managers tend to become complacent. But at this time, the manager is faced with a different set of concerns. While operational problems may be less frequent, people problems will become more commonplace.

Gains in productivity promised by equipment vendors evaporate very quickly when boredom, carelessness and turnover result from over-automation. People are not automatons. At every organizational level they need job challenge, job satisfaction and recognition of a job well done.

Job restructuring is a necessary follow-up to office automation. As the old ways are replaced by newer, more efficient methods, some jobs will disappear and new positions will surface. Managers must be trained to think about how to redefine jobs, how to retrain employees for upgraded jobs and when to move employees to other areas where their capabilities can be used and expanded upon.

Managers should be encouraged to look at new ways to restructure jobs so that every person has both machine and human interaction during the workday.

Connor is head of Ubi Enterprises, a Greenwich, Conn., consulting firm providing education programs for the information-processing industry.

and Much More!



RESPONSE: Distributed Data Processing System

With our new DATYZER option, ANALYSIS can now provide system performance information such as response time for CRT's and computer transaction time. Our newest advance, the NETWORK ADMINISTRATOR makes problem management, inventory control and report generation capabilities available to the teleprocessing network manager.

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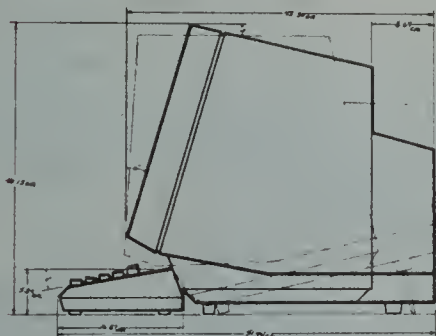
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Paradyne's PIX system permits the computer to do what it does best — batch processing — by relieving it of telecommunications tasks. PIX allows remotely located peripherals to appear to the host computer as if they were in the computer room.

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The result? More efficient, cost effective communication!

Paradyne's RESPONSE adds a new level of advantage to the benefits of

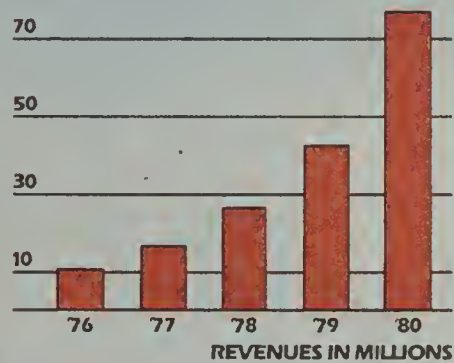


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PIXNET by providing the capability for on-line, interactive processing applications.

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You'll hear top information and advice from major manufacturers, software innovators, legal experts, marketing strategists and financial wizards at the top of their fields.

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You can be there as our specially picked panelists discuss a broad range of industry and business topics and tell you:

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- How to handle first-time users
- How to satisfy your customers
- How to protect your margins
- How to spot a trend
- How to avoid the pitfalls
- How to plan for growth

You can also participate in a wide spectrum of Workshops at THE OEM BUSINESS FORUM and learn more about network configuration, sourcing software packages, design trade-offs in small systems, legal problems and solutions, applications dynamics, new markets, Europe and Japan, and much, much more!

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No ordinary conference

The OEM BUSINESS FORUM is an extraordinary gathering of the industry's executive class. The first FORUM was attended by nearly 500 people, including 116 presidents and CEO's, 88 vice presidents, 67 marketing directors and several-dozen consultants, market and business planners. Among the initial selection of *speakers* for this second FORUM are: 18 presidents, 10 vice presidents and 11 marketing and product managers. More will fill out the roster for the 35 intensive sessions. The FORUM presents a unique opportunity for key people like you, in the computer industry's fastest growing sector, to meet and share problems and solutions.

October 5 (Day 1)

8:45-9:15 **Keynote**
A-1

9:15-9:45 **Coffee Break**

9:45-10:45 **Mini & Micro-Based
OEM Business Update**
A-2

- I. Starting and Staying in Business
 - a. Business structure.
 - b. Financing.
 - c. Successful business plan.
- II. Economic Forecast
 - a. Reagonomics.
 - b. Boon or bust.

9:45-10:45 **The Magic of Sales**
A-3

- a. Organizing the operation.
- b. Qualifying and hiring a sales force.
- c. Defining sales objectives.
- d. Prospecting customers.
- e. Motivating a sales force.
- f. Closing a sale.

11:00-12:00 **OEM Survival Tools for
the 1980's**
A-4

The survival of an OEM depends upon the firm's ability to make a consecutive series of complex market decisions concerning what market segments to pursue, what product features to include and what sales strategies to employ. Many companies run into difficulties because these crucial decisions are opinion based rather than data based. This session introduces a number of simple, practical tools that every OEM can employ to more astutely analyze the marketplace and respond to its ever-changing demands.

11:00-12:00 **Acquisition and
Diversification**
A-5

- Mergers and acquisitions: the viable alternative to corporate growth.
- a. The pros and cons of merger vs. going public.
 - b. Why a company should consider merger and/or acquisition as a sound way to grow.
 - c. How to properly plan an orderly merger/acquisition program.
 - d. Why mergers/acquisitions help make a company more competitive in the marketplace.

12:00-1:30 **Luncheon**

1:30-2:30 **Influence of Growing Local
N-1 Networks (Part I)**

- a. What's hot and why.
- b. Where are we headed & what's the time frame?

2:45-3:45 **Influence of Growing Local
N-2 Networks (Part II)**

4:00-5:00 **Networking and Distributed
Data Processing**

- a. Impact as net elements.
- b. Distributed data bases.
- c. Do we need central processing?

1:30-2:30 **Input/Output: Market &
T-1 Technological Structures**

- a. Printers.
- b. CRTs.
- c. Color graphics, hardware, software.

2:45-3:45 **Mass Magnetic Memory:
T-2 Market & Technological
Structures**

- a. Overview & future trends.
- b. Floppy, Winchester & other disk memory.
- c. Streamers vs. start-stop tape drives.
- d. 64K bit/chip and beyond.

4:00-5:00 **Voice I/O and Other
T-3 Analogue I/O: Market &
Technological Structures**

- a. When do benefits equal cost?
- b. Architecture examples.

1:30-2:30 **Retail Outlets**
O-1

- a. What's the outlook?
- b. Will the big boys dominate?

2:45-3:45 **Are You Ready for an
O-2 Ad Agency?**

- a. Make or buy criterion?
- b. Agency selection.
- c. How you and your agency can best work together.
- d. Where can consumer-level tactics work?

4:00-5:00 **OEM Agreements**
O-3

- a. Franchise fees.
- b. Sales territories, distribution rights.
- c. Quotas, credit, payment.
- d. Second sourcing protection.

1:30-2:30 **Application Generating
S-1 Tools**

- a. Benefits of "user friendly" systems.
- b. Increasing profits and productivity through the use of application generators.
- c. Developing and marketing a system with an application generator as the nucleus.

2:45-3:45 **Software Management
S-2 Strategies**

- a. Value added software development.
- b. Documentation: Gaining a multiplier for software support.
- c. Transportability: Controlling competitive influences.
- d. 24 ways to improve turnkey software.

4:00-5:00 **Application Dynamics:
S-3 Planning for Changes**

- a. Processor independent transportability.
- b. Compatibility for expansion.
- c. Holding down maintenance overhead.

1:30-2:30 **Microcomputer Trends**
P-1

- a. 8, 16, 32-bit processors.
- b. Trade-offs & time frame.
- c. The effects of plummeting costs on high-level processors & high-capacity memory chips.
- d. The near-term system of the future—32-bit micro & 256K-bit RAM chips?

2:45-3:45 **Legal Aspects of the
P-2 Third Party Market**

- a. Legal aspects of OEM vendor arrangements from both the manufacturer and OEM perspectives.

- b. Manufacturer, distributor, dealer, rep., final customer, who can get burned the most and what degree of protection is possible.

4:00-5:00 **Desk-top Computer**
P-3

- a. Struggle for the right niche in a viper's nest of competition.

1:30-2:30 **IBM Watch**
C-1

2:30-2:45 **Coffee Break**

2:45-3:45 **HP Watch**
C-2

4:00-5:00 **TI Watch**
C-3

October 6 (Day 2)

8:30-9:45 **Japanese Vendors**
B-1 "Meet the Press"

Four Japanese vendors will be interviewed by editors from leading computer newspapers, business publications and financial journals about the growth of Japanese firms in the U.S. domestic markets.

9:45-10:15 **Coffee Break**

10:15-11:15 **Software: The Growth Area
B-2 of the Decade**

- a. Market strategies.
- b. Managing software projects. If you can't plan it, you can't do it.

10:15-11:15 **Financing Your Business
B-3 and Product Development**

- a. How much money is needed to start and stay in business? Profomas?
- b. Forecasting/budgeting.
- c. Working capital/venture capital.

11:30-12:30 **Sales & Marketing Planning
B-4**

- a. Main goal & objectives.
- b. Common errors.
- c. Key account strategies.
- d. Distribution channel considerations.
- e. External & internal organizational structures.

11:30-12:30 **The Service Alternative**
B-5

- a. When does free consulting and service become a profit killer?
- b. The OEM and the service questions. Is there a service requirement? Advantages and disadvantages to the OEM. Methods available to accomplish/solve service requirements.

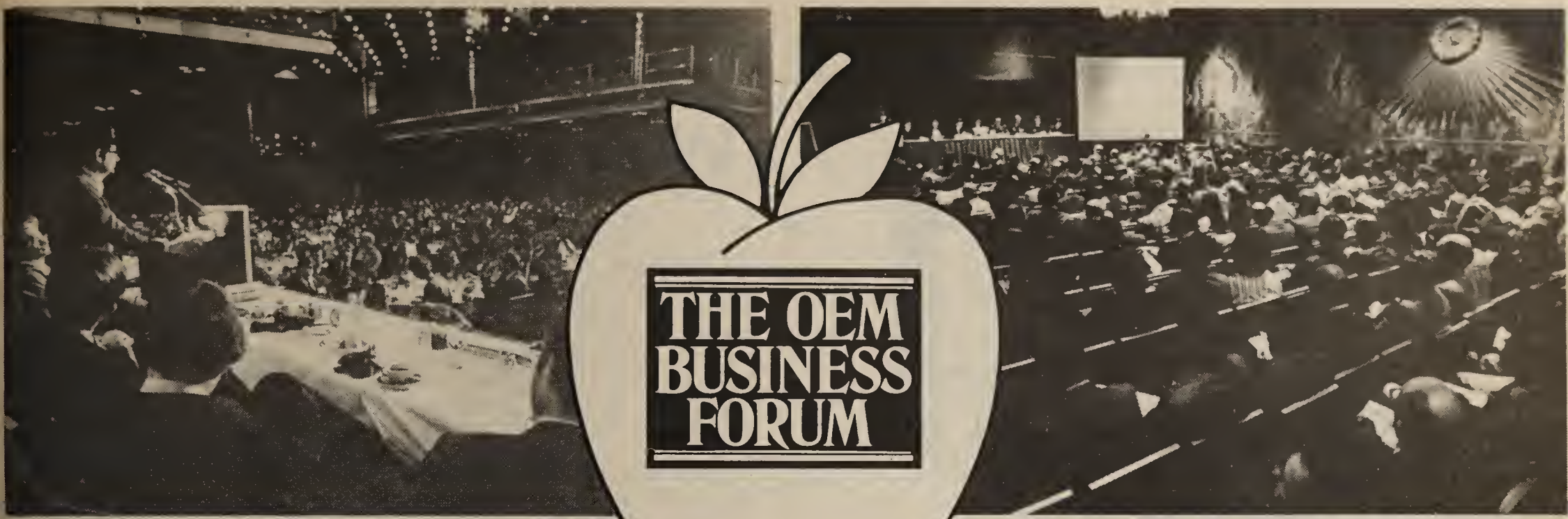
12:30-2:00 **Luncheon**

2:00-3:00 **Europe as a Market**
M-4

- a. Are you ready?
- b. Is Europe ready for you?
- c. Effective channels of distribution.
- d. Marketing philosophies among countries.

3:45-4:15 **Beyond the European
M-5 Market: The Next Step?**

- a. Best bets.
- b. Update on the market.
- c. Channels of distribution.
- d. Maintenance and service.



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October 5th and 6th, 1981
The New York Hilton
New York City

- 2:00-3:00 **PR: The Unified**
U-4 Corporate Philosophy
 a. Agency selection.
 b. Developing the plan & positioning the product.
 c. Press tours/conferences.
 d. Releases.
 e. Editor contact & the importance of personal involvement.
- 3:15-4:15 **Office Automation: One**
U-5 Stepping Stone Beyond WP?
 a. Overview and future trends.
 b. Strategies and techniques for OA equipment sales.
- 2:00-3:00 **Special ADAPSO Session**
P-4
- 2:00-3:00 **Sourcing Software**
S-4
 a. An overview of the problem in today's market.
 b. Make or buy? Realistic estimating of costs.
 c. Evaluating packages for resale.
 d. Evaluating a custom software house.
- 3:15-4:15 **Watering the Software**
S-5 Desert
 a. Potentials of dealing with software publishing houses.
 b. Alternatives in distributing software. Computer manufacturer programs to classified ads.
- 2:00-3:00 **DG Watch**
C-4
- 3:15-4:15 **DEC Watch**
C-5

Featured Speakers Include:

- A-1**
 Al Lay
President
 Cado Systems Corp.
- A-2**
 Lawrence Chimerine
President
 Chase Econometrics
 Division of Chase
 Manhattan Bank
- A-3**
 Richard Raysman
Attorney/CBN Columnist
 Brown & Raysman
- A-4**
 Jack Keen
Dir. Management
 Products
 Input
- A-5**
 Gilbert Mintz
Partner
 Broadview Assoc.
- Robert J. Conrads
Principal
 McKinsey & Co.

Luncheon

- Art Holst
Author/NFL Official
- N-1**
 Robert Wickham
 (Chairperson)
VP., Marketing
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- N-2**
 Robert D. Brannon
Marketing Manager
 OEM Microcomputer
 Systems
 Intel Corporation
- N-3**
 Dr. Harry Saal
President
 Nestar Systems
- Ivan Socher
President & CEO
 Amdax Corporation
- N-4**
 Jon R. David
President
 Systems R & D Inc.
- Brian Green
Regional Director
 Tandem Computers
- T-1**
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 Cipher Data Prod
- T-3**
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- Edward O'Neil
Marketing Manager
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- O-1**
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- Chuck Butkus
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 CBN Columnist
- Stephanie Rosenbaum
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- S-3**
 Gary Long
Partner
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- Casey Powell
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 Special Systems
 Operations
 Intel Corporation
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 Peter Vogel, Esquire
- P-3**
 Allen Michels
President
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Dir. of Value Added
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 General Systems Div.
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- H. W. Mattison
Program Mgr. Value
 Added Remarketing
 General Systems Div.
 IBM
- Paul H. Espersen
Series I Technology
 Consultant
 IBM
- C-2**
 Bob Kresak
Marketing Manager
 World Wide Third Party
 Hewlett-Packard

C-3

- Dr. W. Kenneth Wickham
OEM Marketing Manager
 Texas Instruments, Inc.
- B-1**
 Thomas Hodson
National Sales Manager
 Canon U.S.A., Inc.
- John Rehfeld
Vice President, General
Manager
 Information Systems
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 Toshiba
- J. Garrett Fitzgibbons
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 TRW-Fujitsu Company
- Philip E. Wyatt
Manager
 Office Products Div.
 Sony Corp. of America

B-2

- Ann Winblad
Marketing Director,
Product Planning
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Consultant/CBN
 Columnist
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 Gordon Rapkin
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 Howard Levin
Dir., Systems Marketing
 Arrow Electronic, Inc.
- B-5**
 George McArthur
Sales Manager
 Decision Data
- Luncheon**
 William Moore, Jr.
Vice President Computer
 Operations
 Perkin Elmer Corp.
- M-4**
 Christopher Codrington
Interco Business
 Consultants, LTD

U-4

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- 20 Software Service Vendors
- 30 Multi-Quantity End Users
- 40 Manufacturers of Computer Systems or Peripherals
- 50 Manufacturers of Office, Business, Personal and Consumer Systems
- 60 Hardware OEMs
- 70 Distributors/Dealers/Retailers
- 80 Consultants
- 90 Other (Specify)

- B. Title/Function. Please circle ONE only.**
- 10 Corporate Management
- 20 Operations Management
- 30 Software Development
- 40 Engineering
- 50 Marketing
- 60 Consultants
- 70 Researchers/Educators
- 90 Other (Specify)

- C. Size of Organization (no. of employees)**
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- ___C. 500-999 D. 1,000-4,999
- ___E. Over 5,000
- D. How did you hear about the OEM Business Forum?**
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'Don't Worry It's Just Her Way of Asking for a Break.'

Westinghouse Electric's

By Scott Kerr
Special to CW

PITTSBURGH, Pa. — Productivity improvement at Westinghouse Electrical Corp. is being implemented through electronic mail. What started out as a pilot program has grown into a valuable communications network serving the Westinghouse community on a domestic as well as a global basis.

In June 1980, a study team, consisting of seven individuals from head-quarter's management information systems function, as well as division representatives, was formed to select the best electronic mail vendor for

the corporation.

After the team was assembled, a timetable was set allowing 30 days to evaluate the available vendors, six of whom were chosen to participate in the evaluation process.

Each vendor met the committee members, answered a series of formal questions, made both a written as well as a formal presentation, discussed the "friendliness" of its system, and most important, provided a hands-on evaluation. Point values were assigned to each vendor and personal comments were added by the team members to help finalize a decision.

Vendor Selected

Upon recommendations of the study team, a vendor was selected. The team proposed that a new organization be formed at the corporate level to administer the new service.

This corporate organization would not only administer the system, but would also choose a site coordinator for each location that was to be provided with electronic mail. These coordinators would act as an interface with the corporate function and also provide support for their location.

A hardware vendor was also selected to provide terminal and communications equipment for the service. Finally, the study team recommended a new budget, a strategy for implementation and a forecast for the new service.

A manager was appointed to develop the recommended corporate function. The manager, in turn, hired a staff to become the corporate interface with the site coordinators in the field. As the corporate staff became familiar with the selected system, manuals and training, aids were developed for the entire user group.

Once the corporate staff was fluent with the system, the site coordinators were trained extensively on the systems used and their operation. They in turn trained the new users at their locations. The corporate staff also assisted the coordinators in selecting and ordering the terminal and communications equipment for their new users.

During the early implementation, there were relatively few problems due to the close contact with the corporate staff, coordinators and users. The biggest problem that surfaced during the start-up was getting terminal and communications equipment installed in a timely fashion. The initial user group, in August 1980, consisted of 70 individuals including high-level executives and middle managers.

As the electronic mail service became visible on a corporatwide scale, its growth accelerated at a fantastic rate. The study team's initial forecast was for 200 users by December 1980; instead there were 400 users at that time and as of July, there were more than 1,300 users with 125 to 150 new users being added each month.

This new communications tool has spread, finding standard and custom applications within all organizational units and staff levels.



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Pilot Program Grows Into Global Network

Peer pressure, along with significant management interest, has been a factor contributing to the long list of requests by projected users. The current system is also being integrated with word processing centers across the corporation.

Individuals can now dictate to the word processing center and have their letter sent via electronic mail rather than typing on their own terminals. This makes the service even more attractive to users who do not have access to terminal equipment.

Some Problems

However, the rapid growth of user interest is beginning to generate some problems. As more individuals use the system, and as they become more sophisticated, the host response time is degrading. Local and public networks are also starting to show signs of overload further contributing to the delays.

Additionally, as the user community grows, the expense of terminal equipment becomes a significant factor. Given the current growth rate, the corporate staff is considering the networking of multiple systems.

Feedback from the electronic mail community at this time is extremely positive. This new tool helps to improve communications between locations both within the U. S. and internationally. Also, communications within a single location have improved where a group is spread out over the site.

As time goes on, many other benefits are beginning to show. The working day of users on the system has expanded by bridging the time zone gap with other contacts around the globe. User ability to communicate from home and while out of town has increased remarkably. Large user groups are now kept informed more quickly of vital information.

Worldwide Communications

With portable terminal equipment, workers at construction sites where communications were once a problem now have worldwide communications capability. And finally, the elimination of unanswered phone calls has both increased productive work hours and reduced the frustration of telephone tag.

Along with the notable advantages come several drawbacks that are user-induced. Many users have become extremely dependent on the system. When the system is unavailable or there is no terminal equipment available, these users feel that they are losing touch with their community.

Some individuals have expressed concern over the loss of verbal cues in their correspondence with their interest group. These users feel that some topics require a more personal touch, verbal cues and voice fluctuations, than the service provides. This requirement may be filled by another office automation service — voice message switching, which is now coming into play.

There are also times when too many memos of little or no importance

plague a user's mailbox. Thus, the threat of electronic junk mail looms over some users, even though security measures prevent tampering from outside sources.

Also, overly aggressive managers are beginning to expect subordinates to always read their mail, even on the weekends. This can turn an entire group off to the system by reducing personal privacy.

Finally, the cost of both terminal equipment and services can get out of hand if they are not properly controlled. The biggest impact in this cost area is that of storage on the system. Many users file mail items away

and forget about them, thus compounding storage costs every month.

Even though this new office tool has only been in use for a short period of time, it has become a topic of general discussion. Users feel that the electronic mail service is a very good communications tool when it is operated properly. Individuals can now respond to mail items much faster and can also initiate communications on an accelerated basis.

Due to the fact that the system can be accessed at the user's convenience, and that it helps to eliminate phone calls, the user's workday is filled with fewer interruptions.

Thus, the user has more control of his working day, allowing for more hours of concentration.

As the population of terminals increases in the field, more individuals are finding multiple uses for them. This helps reduce the need for several terminals to do several tasks.

As this effort to increase productivity continues to grow, many new and different techniques will come and go. New terminals, services and procedures continue to flood the market in an attempt to answer the user need for something better.

Kerr is a telecommunications analyst at Westinghouse Electric Corp.



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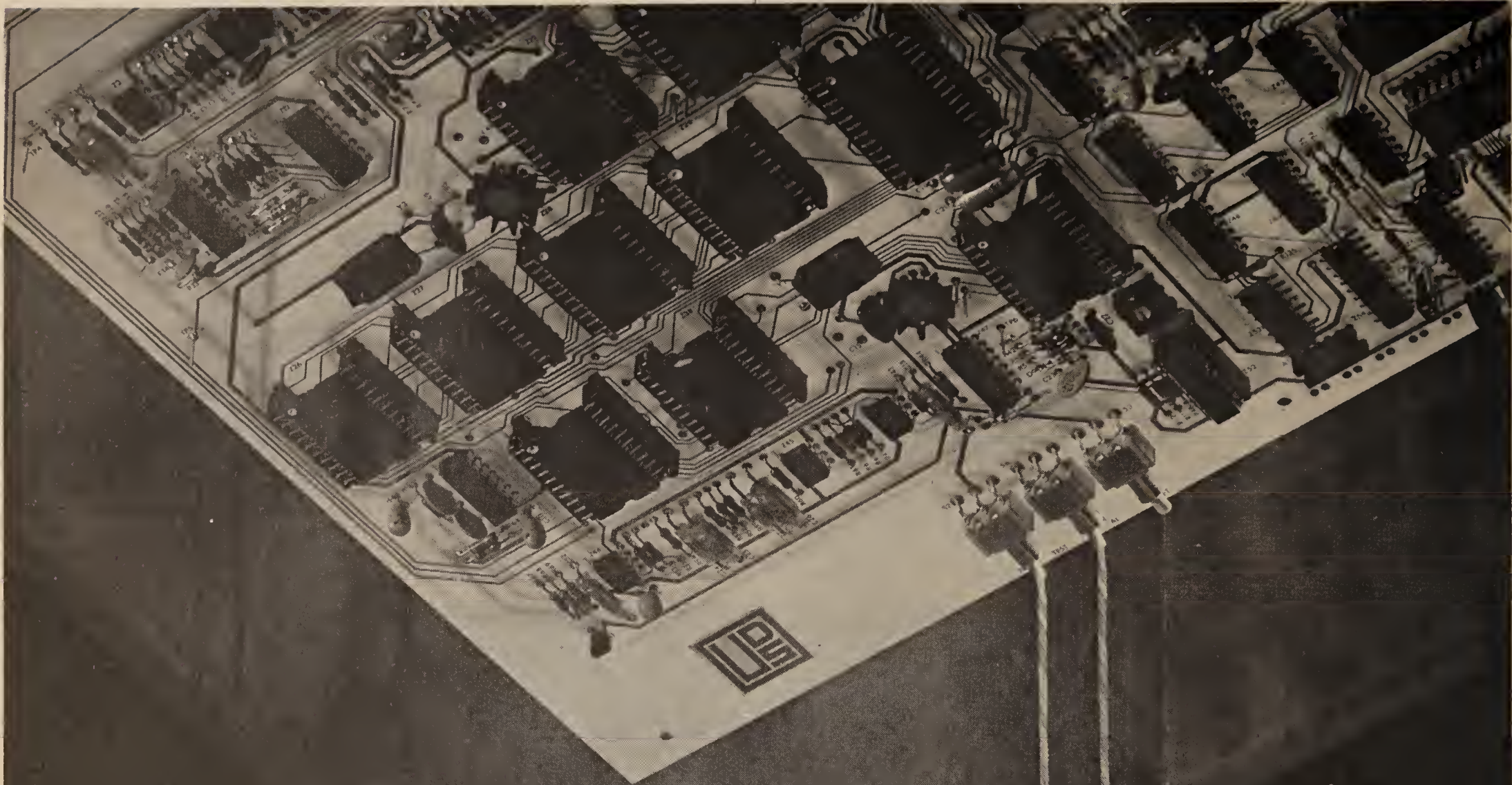
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Created by Dayner/Hall, Inc., Winter Park, Florida



Data in WP: Very Valuable — And Very Easy to Steal

By Leslie Ball
Special to CW

Over the past 20 years or more, researchers and technicians have spent a considerable amount of time and effort in the creation of secure data processing environments.

With the movement to word processing, electronic mail, facsimile transfer and other technologies, we must now transfer that knowledge to the automated office. As in DP environments, we must be willing to make the necessary commitments of time and money to obtain an appropriate security level. However, there is a major difference between securing the DP environment and securing the automated office. That difference is a result of what is generally stored in the two systems.

In most WP systems we find a significant amount of management information. While the data and information from computers is used for operational management decisions, strategic decisions are most often based on information found in WP systems.

Consequently, theft from a WP system is potentially more valuable to a thief than theft from a DP system. The information that could be stolen is that which management might be using to determine whether to market a new product, build a new plant, or develop a new pricing policy.

Even though the information is more valuable, most frequently access is easier than in a DP system. WP terminals are not locked in a secure room. Floppy diskettes are not properly stored. Access to multistation systems is not logged or controlled. Anyone with an ability to type and to read an operations manual can have complete access to the WP system. Unfortunately, that is nearly everyone who works for the organization.

Lack of concern about system access is a result of the organization's concern with the value of the equipment rather than

(Continued on SR/56)

Programmed Alternatives

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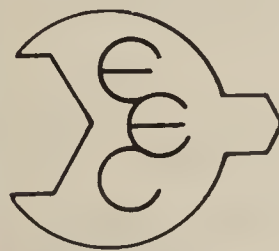
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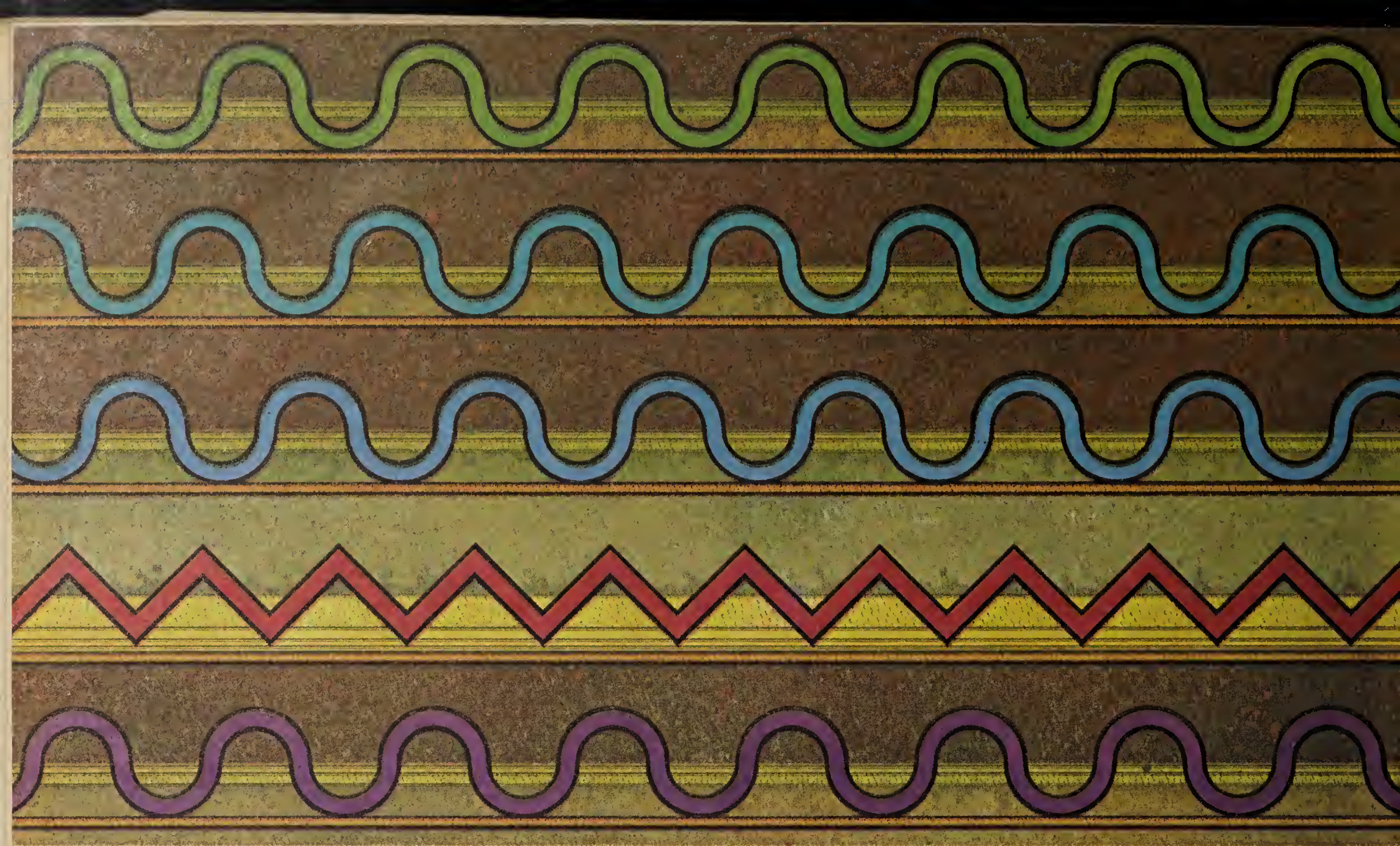
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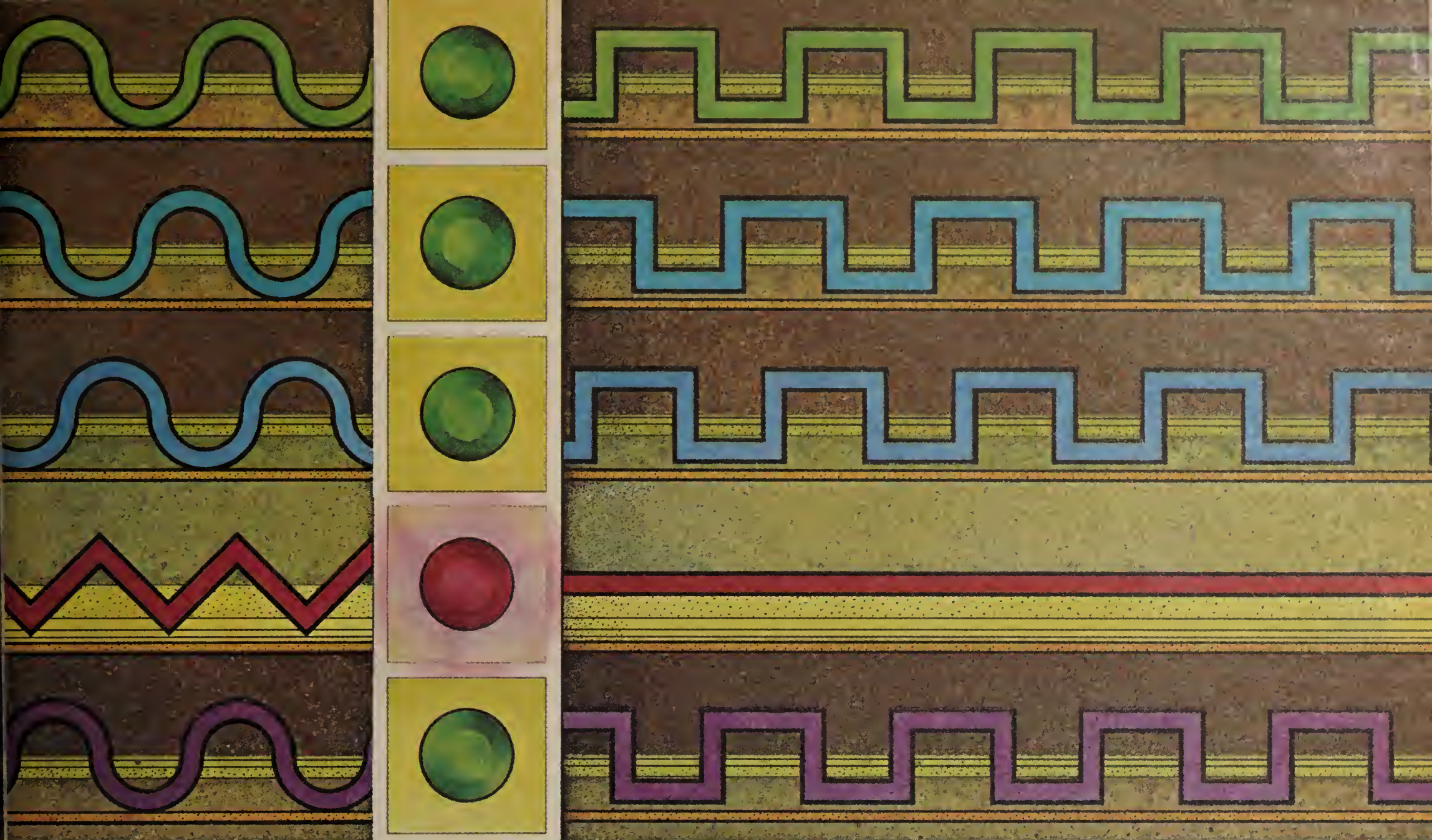
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The knowledge business



(Continued from SR/53)

the value of the information over which WP systems have custodial power. Relatively speaking, DP systems cost a lot of money while WP systems cost very little. However, the value of their information content is inversely related to equipment cost.

Few organizations are willing or able to create a fortress around WP activities as they have done around the DP center. Doing so would be

expensive and severely reduce productivity, which is what WP is designed to increase. Therefore, the major difference between data security and information security is that information ought to be protected better than data, which at the present time is not happening.

Security problems in a WP environment are generally associated with misuse, which may damage the integrity or the timeliness of

the information.

One security breach is to delay the production of the information. Often information is very timely and the delaying of its production will make it valueless. An example is a proposal or a bid that must be produced by a specific date and time and if delayed, will result in lost revenues or additional expenditures.

Obstructing the production of a document is much like

delaying it. However, the difference is that obstruction is a permanent delay that will result in never being able to produce the document.

Damaging of information is another security breach. Very frequently damage will result from some unintentional act by an operator or someone else. A WP operator at a Massachusetts college, for example, inadvertently inserted a previous copy of a

page into a proposal, causing the context to be incorrect, thus eliminating the college from being considered for a major grant.

Destroying the information is more complete than damaging it. This too is often done by some unintentional act. Recently, the secretary of a vice-president of a major consumer goods manufacturer unintentionally destroyed a month's work.

Perhaps the most severe misuse is using the information for purposes other than its intended purpose. Often no trace of this act exists and, therefore, the organization never recognizes that the information has been used inappropriately.

Altering Information

Altering information can have a devastating affect on the organization. The decision maker could make a decision that is completely opposite to that which would have been made with correct information. Perhaps the only misuse that is easily prosecuted under the U.S. Criminal Code is stealing the information. In this case, a floppy diskette or other media is actually removed from the organization's place of business. When this occurs the use of the information is denied to the organization and a severe loss results.

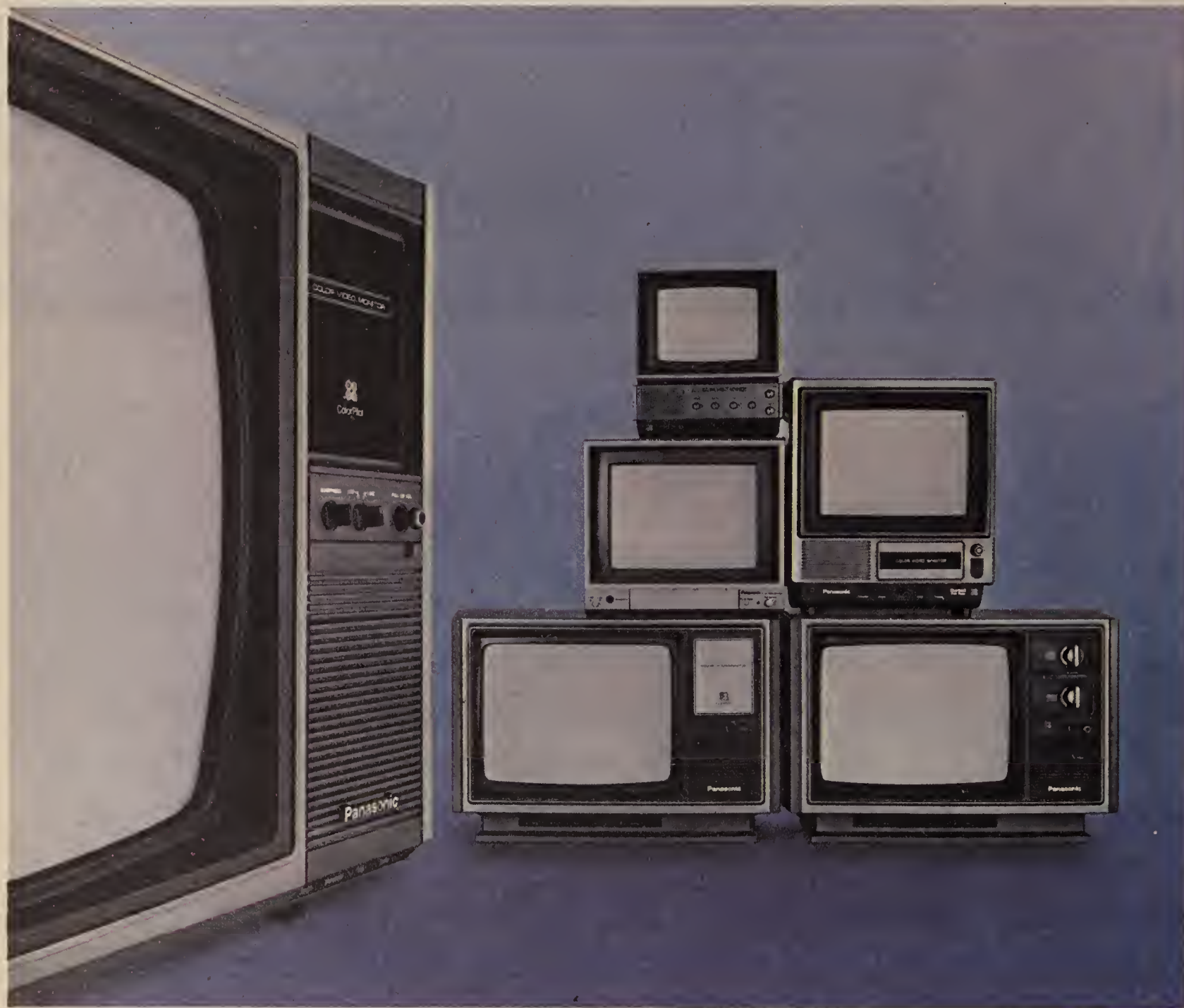
All of these problems must be addressed in the creation of any security plan for a WP system. Each misuse can create severe problems for the organization that might jeopardize its very existence.

As an organization becomes more sophisticated and begins to use other automated office systems, the same types of problems become more of an issue to the organization. Consider, for a moment, the use of electronic mail and facsimile transfer.

A common problem in data communications is data cross talk. In a telephone conversation we have all experienced hearing another conversation on our line. The same thing happens in data communications when public lines are used. Data cross talk will cause you to receive a string of information that is not yours. This could potentially create havoc in an organization.

The solution to these security problems is unique to every organization. In any given organization a great deal of thought, effort and planning must be given to arrive at an appropriate solution.

First, top management must give complete support to the planning and implementation of a viable security plan. Support should be acquired by demonstrating the severe



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impact of security problems on the organization. Only when management recognizes the problems associated with these misuses will they supply adequate support.

Once that management support has been acquired, a security team should be organized. This team should be made up of representatives of all constituencies affected by WP. In addition, computer or WP technicians and consultants should be represented on the team.

Responsibilities must then be assigned to the team members. Finally, policies and general control objec-

tives must be established by the team members. This initial planning process is important for the proper execution of the next phase. It establishes the scope of the project and its direction.

Develop a Threat Analysis

The first operational task is to develop a threat analysis. A threat is a danger to the organization. As a first step in the development of a threat analysis, the security team should carefully study the WP environment. This will provide the team with an understanding of how WP is used in the organization.

It is important to know

what types of documents are to be created and how they might be utilized. This will identify the potential danger to the organization should a security breach occur.

Given a threat, a vulnerability is a lack of protection against that threat. The team should identify all vulnerabilities that exist in the WP system. Often this is an iterative process that must continually be updated as an infinite number of vulnerabilities might exist.

For each vulnerability the risk that a breach might occur should be determined. Often this is highly subjective and open to a great deal

of debate. Even computer security specialists have not developed an adequate solution to this problem. However, being able to at least classify risks as being low or high will provide the team with an understanding of where to concentrate their efforts.

Once the risk of each vulnerability has been established, an expected loss for each should be created. This provides an appropriate measure for the selection of safeguards that should be implemented. These should be expressed in dollar loss or some appropriate measure that can be understood by

management.

Finally, safeguards implemented should produce some positive benefit to the organization. Often they will be simple control procedures that might also determine the direction of the automated office in the organization. At the very least, they will influence the purchase of additional hardware and software.

Ball, an associate professor of information systems at Babson College, Wellesley, Mass., is chairman of the ACM's Special Interest Group on Security, Auditing and Control and is an information systems security consultant.

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Technology Already Established

Survey Sees Integrated Information System

By Evelyn Wilk
Special to CW

When will integrated information systems become a reality?

Last year Arthur Andersen & Co. chartered a Technical Advisory Committee "to identify technological trends in the information/computer industry for the period 1981-1990."

Their assessment looked first to estimate when the technology in question is no longer "blue sky" technology, but something that can be used, and second when it will become economically feasible for companies to install.

In the software area, they concluded that all the technologies necessary for integrated office systems are proven today, and we can expect significant user market penetration by 1983 or 1984. With easy-to-use user languages and relational data bases, the capabilities of these systems will significantly increase by 1985.

The same holds true for hardware trends, with the cost of storage continuing to decline, until, by 1985, storage will effectively cost \$10 for 20M bytes. The only technology not yet fully proven in the communications area is international data network control.

Technology No Barrier

With technology no longer a barrier to integration, planners of integrated systems must address two factors that can, if not adequately considered, become barriers to integration: human nature and the nature of office work itself.

When we propose to automate a function, we are, in effect, changing the rules of the game by which the office worker has learned to survive.

At first, the new procedures may be thought of as difficult and frustrating, and the new user will blame the equipment for "making my job harder, not easier."

Another effect of integrated systems on the management worker is the change in communications. Today managers spend a majority of their time absorbing or giving information verbally or in writing.

With integrated information systems, the communication mode will become a typed or verbal message on a terminal or voice mail system that will be read and answered at an unspecified future time.

Many people today are reluctant to leave messages with humans for fear that they will be garbled in translation. Imagine, then, the fear of the nontechnical person of trusting information to the digital limbo of a computer system.

Make It User-Friendly

Don't underestimate the need for user-friendly hardware. Office workers are not trained programmers, but they do relate to a normal typewriter keyboard. Choosing hardware with unfamiliar keyboard layouts will add to the height of the potential resistance barrier.

Planners for integrated information systems must recognize those per-

ceptions in the user community and plan systems to minimize frustrations and resistance.

Systems designers and implementers must also understand that the nature of work performed in the DP department is different from the rest of the office. The knowledge worker, the professional and the manager work in a less structured environment. Structured design techniques just don't work in the office environment in the same way that they do for DP systems.

In DP, once a problem is identified,

it is reduced to its elements, analyzed and a solution programmed that can be used repeatedly on vast amounts of structured data. In the office, on the other hand, information files are minor in size compared to DP files. Instead of a few major problems, the manager faces a never ending stream of different problems that require quick solutions.

Until recently, the differing record structures in WP and DP (structured numerical data or text of unpredictable record length) dictated the use of separate systems to process words

or data. And the special coding characters imbedded in the word processing file are unlike anything DP systems were built to handle.

Recent software advances have made minimally adequate word processing applications available on computers, but it is still difficult to find one system that handles both intricately structured data files and complex text with equal facility.

Benefits of Integration

Integrating both types of files into systems that provide a manager with



We were here three years ago.

Human Nature Possible Obstacle an Industry Reality for Users by Mid-'80s

full information at his fingertips will not be easy. But the ability to provide complete information is the major benefit of integrated systems. Management not only needs complete information to make intelligent decisions, but it also needs relevant information rather than piles of computer printout and reams of textual reports.

We should integrate word and data processing systems in the office only when integration answers business needs. An obvious need is to eliminate the grunt work of rekeyboard-

ing when we have data that exists in one system but not the other.

Today we frequently have duplicate data in parallel systems with the same personnel using both WP and DP systems to retrieve information that will be combined into management reports.

Although remote branch offices need access to information in the corporate data base, they may not need localized computer power. A word processor at the branch site with computer terminal emulation may be all that is required.

'With technology no longer a barrier to integration, planners of integrated systems must address two factors that can, if not adequately considered, become barriers to integration: human nature and the nature of office work itself.'

There are two ways to approach integration of WP and DP, each having its own benefits. Large companies

will have internal technical expertise to develop a "build your own" integrated system: different components from different vendors and custom written software for interface.

Small companies may not have the technical expertise to "build your own." The small company may have technically proficient employees, but unless it wants to dedicate a person full-time to the integration question, a more workable solution is the sys-

'As with any major capital expenditure the investment in integrated systems makes sense only if the benefits outweigh the risks. the reward structure of most companies favors short-term problem solving over long term.'

tem in which both WP and DP reside.

Overcoming the limitations of putting WP and DP in the same system from the hardware standpoint will require rewriting the operating systems to accommodate multitasking and the heavy memory usage requirements of WP software.

Some vendors have already begun to do so, and the newer systems go much further than before toward efficient handling of both WP and DP files.

Planning For Integration

As with any major capital expenditure the investment in integrated systems makes sense only if the benefits outweigh the risks. After all, the reward structure of most companies favors short-term problem solving over long term. We are paid on our short-term results and some say that you cannot plan for the long term at all.

You can also overplan and lose sight of the short-term needs. What is necessary is a combination approach that is workable in the dynamic environment of integrated information systems.

First of all, define where you want to go in the long term. Set your objectives; define functional needs. Set some time parameters and some check points. But, do not try for precision in your long-range plan: you often cannot define the single optimum answer.

This approach allows you to solve immediate problems and still have a good foundation for the future. Ill-fated experiments may occur, but monitoring them against the plan limits your "losses."

Your real goal is to avoid the scattershot approach of installing systems that can never fit together and making irretrievable commitments that are undertaken because no long-range goal was set.

With this approach you can meet short-term business needs and at the same time build the foundation for long range solutions that are both state of the art and practical.

Wilk is a manager in the Management Information Consulting Division of Arthur Andersen & Co.



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WP Service Bureaus a Way to Handle Peak Loads

By Virginia L. Berger
Special to CW

Knowing how much capacity is really needed can be difficult to determine when setting up or expanding a word processing facility.

An accurate assessment becomes more complex where needs are seasonal (but predictable) and becomes virtually impossible when the size of the work load varies widely and has little or no perceivable pattern (as in law offices and brokerage firms).

Should you gear up for these peak load periods? And conversely, if you don't, how will you handle them?

If you project the cost of personnel

alone — without even considering equipment, space and other related expenses — you will find it difficult to justify maintenance of a WP operation sized for maximum work loads. And yet, can you afford, during these extraordinarily busy periods, to let paperwork fall behind? Can you afford not to produce needed documents on time?

A WP service bureau can solve many problems for users with diverse needs. But, as with DP services, WP service bureaus run the gamut from a couple of large million dollar organizations with outlets in many states to outfits as small as one or two

people working out of their homes. Also, the quality of both the work done and the service given can have little to do with their size or experience.

Service bureaus operate in a variety of ways. Charges can be by the hour, page, line or keystroke. Turnaround can vary from the same day to a week (of course, this is also largely dependent on the nature of the job). Pickup and delivery may or may not be included (or available).

You may be able to get a range of services — or only one. One shop may offer service only during regular business hours, while another

runs 24 hours. You may have to make advance arrangements or you might be able to call the same day. Your originators may or may not be able to stay on and work with an operator.

Given this diversity, how should a prospective user select a service bureau?

If possible, a user should anticipate the problem and interview prospective bureaus before the actual need arises.

Verify that the service's WP system is compatible with yours. Inquire about turnaround time and about the service's general familiarity with your kind of work. Ask for rates and seek clarification. Find out precisely what is included in the rates quoted — and if there are any extra charges.

Ask about pickup and delivery. Find out whether you can purchase completed disks and the charge. Lastly ask for references.

Some Do's

Should you decide to use the service, make sure you describe your work and your time frame accurately.

Go into detail about specifics of format and any other special needs — the service is there to do the job to your satisfaction, but you must tell the service what you want.

If your document is to be produced on special stock or in a unique typeface, be prepared to supply it.

Remember that while the staff in your office is familiar with your work, the service is not. Be specific.

Finally, be sure that you leave the name and telephone number of a contact — preferably the originator of the document — so that any unanticipated questions can be answered in the course of the job. If you cannot put the service in touch with someone to answer questions, be prepared to accept whatever default parameters or standards the service has set up.

Some Don'ts

Don't expect a service to make editorial decisions — write clearly and mark revisions accurately.

Don't expect the service to make priority judgments between the work of two originators in your organization.

Don't expect a service to estimate the cost of a job without seeing the document in question and having time for a thorough review.

Don't expect a WP service to perform non-WP tasks. If you must have a clerical chore done by the service, be prepared to pay WP rates for it.

Don't expect the impossible; set re-

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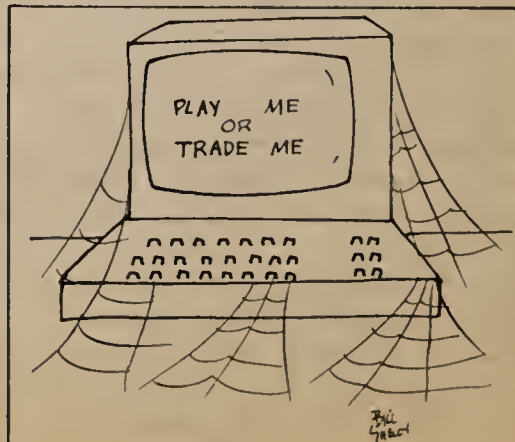
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alistic time frames. As a customer, of course, you can ask for what may seem impossible and you may sometimes even get it, but don't expect that the service will always be able to do it.

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But remember — the quality of the input affects the quality and cost of the output. In addition, when using your own prerecorded medium, advise your service of any quirks of your own operating procedures that may be unique or unclear to an outsider.

The most visible advantage to you in using a service bureau is that you only pay for what you need. And you only use the bureau when there is a need. This makes the use of a good service extremely cost effective and can help you avoid the necessity of expanding your own regular facility to handle irregular but critical peak loads.

A further item on the positive side

is availability and convenience. It is the business of the service to be there when you want. This is not always the case with your own in-house staff. Instead it is up to the service to find the overtime personnel to burn the midnight oil while you lock your office and go home.

Berger is a consultant at the Center for Word Processing, Inc., New York, N.Y., a WP service bureau.



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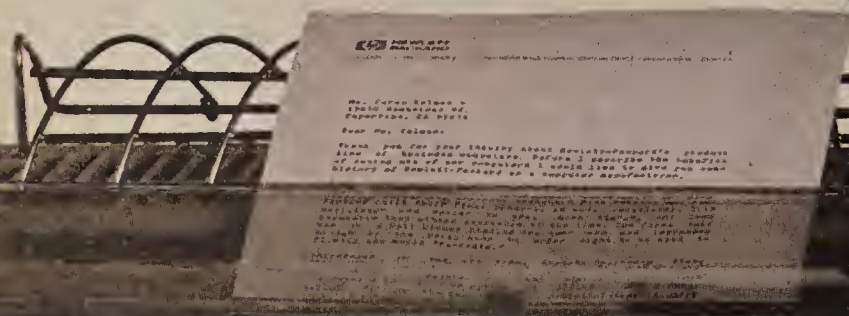
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Who Should Manage Area of Word Processing?

By Stephen L. Priest
And Vincent J. O'Sullivan
Special to CW

Should word processing be centralized under the management information systems (MIS) department or be the sole responsibility of the end user?

In WP's brief history, it has been considered the concern

of the end user, with MIS executives viewing WP solely as a secretarial tool and not as part of an automated system. However, many MIS executives are beginning to change their minds.

One point should be understood at the outset. No matter who has the ultimate responsibility for the system, this is

not an instance of someone buying a "fancy typewriter." To most laymen WP is a fairly sophisticated computer application and in some cases represents their initial foray into the field of electronic data manipulation and storage.

WP functions will differ according to the existing insti-

tutional framework. One WP application might utilize an organizational scheme of a typing pool under the MIS department where user requests for WP services are sent to MIS.

Another could be a distributed approach where the WP computer is located in the MIS department, but termi-

nals and printers are given to each user department for its own use.

Provide Aid

Our stance is that the MIS department should provide advice and appropriate assistance in selection.

This policy will minimize duplication of data storage and make the user aware of the potential of WP if integrated with other MIS applications.

Using the MIS staff as consultants when reviewing WP equipment can mean significant user department savings and cost avoidance. The in-house staff is aware of WP-compatible in-house hardware and can avoid acquiring duplicate hardware.

Further, the vendor of the current in-house system may have WP software that can often be acquired at significant savings.

It is possible that existing DP hardware can offer many options to the user department not available with stand-alone WP equipment. For instance, there can be access to existing MIS data files and the potential of organizationwide communications.

Complex Process

MIS can contribute significantly to the acquisition of a WP system in the area of contract negotiations. This process is a complex one that is rife with pitfalls for the novice.

There are usually a number of hidden costs that can substantially increase the base expenditure.

Aside from the initial outlay for the basic WP equipment, a maintenance contract is a major cost item that must be considered.

Additional storage space must be carefully assessed for its long-term financial impact. Add-on features or optional software constitute considerable additional costs.

The user need not proceed by trial and error. In essence, it is acquiring a very specialized minicomputer and there is no reason to ignore the expertise of people in the institution who have been through this situation before.

It is also advantageous for the user to keep in mind that outright purchase of WP equipment is only one of its options.

Priest is director of information services and O'Sullivan is manager of the Regional Cancer Registry Program at the Brockton Hospital, Brockton, Mass.



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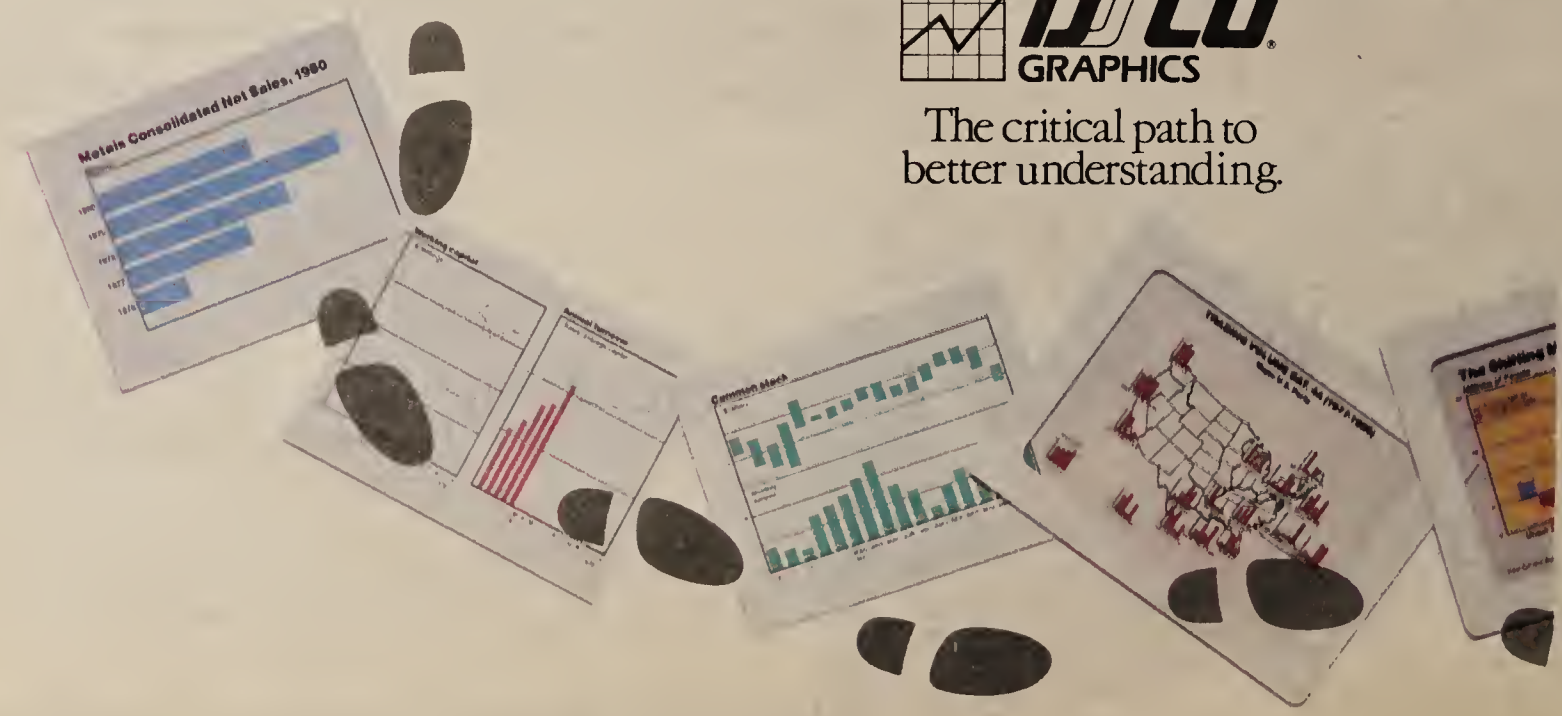
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The critical path to better understanding.



With Task Force Structure

Standard Oil Unearths Plan for Office Success

By Richard M. Rosenbaum
Special to CW

CHICAGO — What IBM now calls the Professional Office System (Profs) and what Standard Oil Co. of Indiana calls the Electronic Office System (EOS) has influenced the path of office automation at Standard, a major integrated oil company. It has provided an in-depth perspective on some critical office automation issues and concerns.

The EOS used at Standard was jointly developed by IBM and Standard's Amoco production subsidiary research organization in Tulsa, Okla. This effort began in 1977 and continues today.

There are approximately 800 users of EOS throughout the organization, including about 450 users at the Tulsa research facility; about 100 users at a corporate facility also in Tulsa; about 100 users at the Amoco Canada facility in Calgary, Alberta; and about 150 users at the corporate headquarters in Chicago. Despite the relatively large number of users, the use of EOS is still considered to be experimental as far as the corporation is concerned.

EOS is an integrated multifunctional system that allows users to create documents (word processing), distribute documents (electronic mail), store and receive documents (electronic file cabinet), send and receive informal messages (computer-based message system) and perform personal administrative tasks (for example, calendars, reminders and phone books).

Corporate Task Force

The success of EOS at the Tulsa research facility prompted corporate management in late 1978 to appoint a corporate task force to evaluate office technology in general. The base objectives of the task force were to consider whether it was timely and feasible to devote corporate attention to advanced office technology to enhance the effectiveness of office workers; and, if so, what initial steps should be taken to do so.

The task force structure consisted of an office technology working committee that had 12 members to it including the chairman. The chairman was the former general manager of the DP department, who was on special assignment for the executive vice-president of finance before taking retirement.

Other members of the working committee were from the information services (computer, DP), employee relations, controllers, research and secretary (administrative services) departments. Only one other person from information services and myself (representing the administrative services area) were full-time on this committee.

The office technology working committee reported to another special office technology steering committee that was set up. The steering committee was composed of higher level managers consisting of various vice-presidents and general man-

ers of strategic corporate departments (employee relations, information services, controllers, subsidiary administration, research and secretary).

Finally, an office technology liaison group of 10 working-level managers was set up to counsel and advise the working committee in its deliberations and findings.

After about nine months of work, the working committee reported to the steering committee that it was time to begin serious consideration of office technology and that a small

planning group should be established within the corporate secretary's (administrative) department to lead the effort.

During that nine months, the work consisted of determining what systems were in the company; what systems and plans the major vendors had in mind; what other companies were doing about office automation; what were the basic costs, benefits and returns; and what internal company organization, policy and procedures might be affected.

The steering committee approved

and reported these findings in late 1979 to the standing management committee of the corporation, who gave the final approval. In April 1980, the office technology department was formally established within the corporate secretary's department.

The office technology department was purposely established away from the corporate computer (information systems) department into the administration area (secretary's department) of the corporation in order

(Continued on SR/66)



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(Continued from SR/65)

that the thrust of office technology be user-driven rather than technology-driven.

The office technology department consists of seven people including the manager and administrative secretary. Its initial character was to monitor internal company and external office technology activities; share responsibility with the Tulsa research organization for the continued testing of EOS; coordinate tests of other systems as desired; and develop plans for the gradual adoption of office technology supported by user demand.

We have currently formulated five basic tenets — all of which are subject to change as circumstances warrant:

- It is premature to decide on a corporatewide office technology system at this time.

- Vendors are just beginning to offer the semblances of good office technology systems.

- There is room and time to experiment.

- Systems ought to be geared toward the principal — most systems today are aimed at the secretary.

- No one has the ultimate system (and we are years away before we start to get close).

Five Issues

As far as EOS is concerned, we think it is one of the most advanced integrated office systems known to exist, but it is not yet ready for corporatewide implementation. There are five issues of concern that we have with EOS:

- There are required functions that EOS currently lacks.

- The ease-of-use and friendliness of the system to the unsophisticated user is generally unproven right now.

- There are long-term questions of whether the host-based architecture that is represented by EOS will meet the basic user requirements or whether more distributed architecture will have to be employed.

- Compatibility and on-line access between VM/CMS operating system and MVS operating system environments need to be addressed to ensure integrity of EOS data bases with other corporate data bases.

- The resources and support that IBM will give to this product or successor products and the integration of this product into other IBM office system products is yet to be established or known.

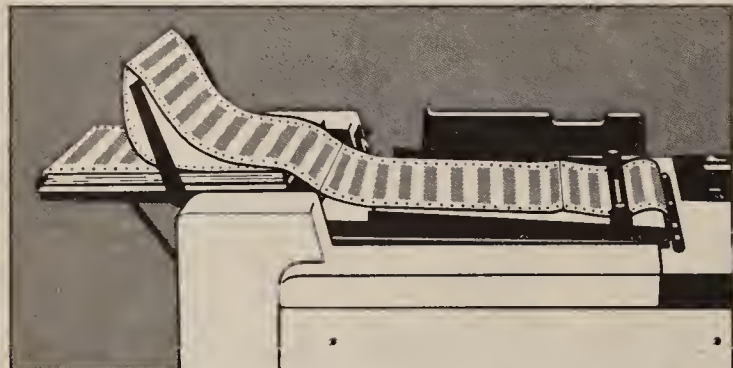
Nevertheless, there have been major benefits of EOS to the corporation so far. It provides an outstanding working demonstration of an integrated office technology system and gives us an insight into what it can and should do for the office worker. It provides a tool for us to gain better understanding of how to achieve office worker productivity increases, how to measure productivity, how to train and educate users and what kinds of on-going user support is necessary.

Future plans for EOS call for us to work to continue to improve its functionality, expand its use into other corporate environments on a test basis, determine the merits and demerits of a distributed architecture for EOS and begin to prove that the benefits of EOS are worth the costs.

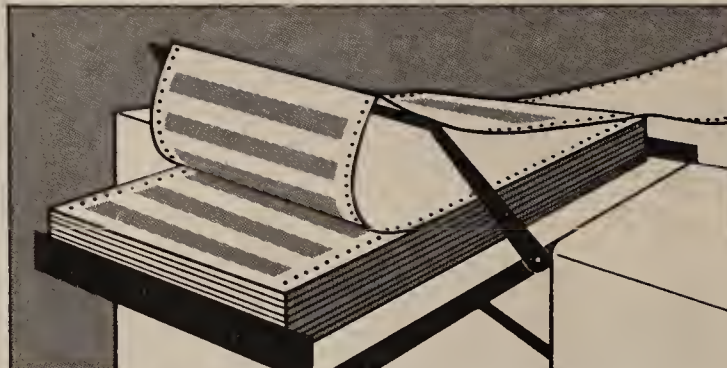
Rosenbaum is a consultant in office technology for the Office Technology Department of Standard Oil Co. of Indiana.

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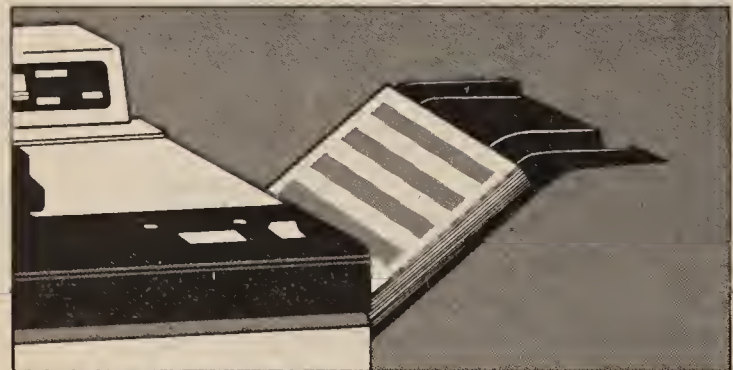
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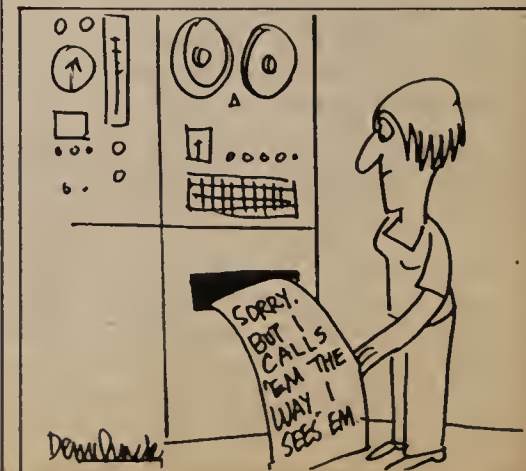
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Afraid of Job Changes, Being Replaced Workers Said Fearful of 'Creeping Automation'

By J. Thomas Horrigan
Special to CW

Office automation is creeping into our environment, making its presence felt as new equipment becomes available and communications among various types of equipment becomes easier.

This creeping automation is affecting more and more businesses and raising many concerns with employees. Employees often fear that of-

ice automation equipment will replace them or change their job for the worse; they are concerned whether they will be able to learn what is required of them. Often they do not admit these fears — even to themselves.

Since DP and office automation share many similarities and may ultimately share some of the same hardware, office automation efforts are often introduced

into an organization through the DP department.

System Complexity

Office automation can run the spectrum from a very simple system such as a word processor with little or no DP capability to a fully integrated system.

This variability in configuration and complexity of office automation systems will present a challenge to trainers in presenting the system to users, many of whom have different requirements.

In many cases, the vendor supplying the equipment and/or software will provide training on its use. However, what is often not provided is education regarding what office automation is and is not, and how this new piece of equipment or system fits into the work environment.

Before the first technical "how to use it" training session is ever held, potential users must be informed about the new system being implemented in a "what it is" session. The typical user will most probably not be a DP professional and will not be sophisticated or even familiar with the use of DP, electronic storage and communications equipment.

Some May Object

Additionally, some of the users may object to using a keyboard, which may project to them an image of clerical work. Users will range from clerical employees to top management, depending on the nature of the system and how widespread it is throughout the organization.

Lines of communication must be kept open during both the planning and implementation phases so that these users will be represented during the needs and analysis selection. The user representatives and management should report periodically to the user community regarding plans and how the selection and installation are progressing.

Prior to involving employees in the selection process, an attitude survey of potential users may be helpful. A requirements survey should be conducted to ensure that user needs are known. As trainers, you may want to add questions to the survey to determine users' attitudes to the concept of office automation itself.

As with anything new, there will be rumors about what is coming, when it is coming, what it will do and who and what it will impact.

Often, the natural human reaction of fear of the unknown will surface. When people do not know what is coming, they cannot always be expected to react in a manner that is open to change.

Some people are going to feel threatened and may believe that their job or a function they perform is in jeopardy. Therefore, a mixed or even unwelcome reaction to an office automation effort is not unusual. Outright hostility and in some extreme cases possible sabotage of the system or the data provided for input are possible. Sabotage could, in someone's mind, show management that this system does not work and that the "old way" is better. The "old way" may also happen to be more comfortable and nonthreatening.

Sabotage Not Typical

However, sabotage is by no means typical. Skepticism and outright hostility predictably occur in some groups, particularly those that have "done it this way for years." This group of individuals is often very vocal in their concern and can adversely influence the remainder of the group.

To allay the fears that may surface and to facilitate system acceptance, the WP trainer should be concerned with several activities. Potential users must be educated on the concept of office automation as well as trained in the specifics of the system being installed. This education will involve changing many people's attitudes. Included in this should be information on:

- What is office automation?
- What the system will/will not do for the users.
- What the system will/will not do to the users?

Answers to these three critical questions will probably help prevent many potential problems in user acceptance of the system. This, of course, assumes that the system works as promised.

To help accomplish the goals of user acceptance, frequent communication is essential between both upper and middle-management and the users regarding the plans, progress and user needs and concerns. Supervisors must be familiar enough with office automation to discuss employees' concerns. Periodic progress reports from senior management could help meet part of this need.

The complexity of the system will dictate the amount and level of training and education that must be done. For example, installing a single stand-alone word processor will certainly require less training and education than an integrated system incorporating WP, information storage and retrieval and electronic mail.

Management Commitment

Only one factor has greater potential than employee resistance for devastating the acceptance of an automated system: lack of management commitment. If an integrated system is being installed companywide, then most probably there is management support. However, if smaller systems are being installed in spots within a company or department, top management may not be committed and may be reluctantly agreeing to an experiment. In that case, top management needs to be educated too.

Some Obstacles

As a system is implemented, continuing problems may (and probably will) arise. These problems are bound to be both system and human acceptance problems. One problem I observed in a government agency is that WP operators are classified at a lower grade than a secretary who uses a regular electric typewriter.

Therefore, while WP machines may improve a secretary's productivity under heavy, repetitive typing loads, there is a disincentive for secretaries to use the equipment. If they use the equipment too much, they fear they may be reclassified into a lower job and pay grade. Another behavioral obstacle is that of a manager's reluctance to keyboard data because it is not "professional."

The first situation is an example of an organizational problem that can be solved by reviewing and perhaps revising job descriptions and levels. The second (managerial reluctance to keyboard) is a behavioral problem that may be overcome by education.

Until office automation becomes more widespread and accepted, education and attitude change will be critical factors in the acceptance of an office automation system.

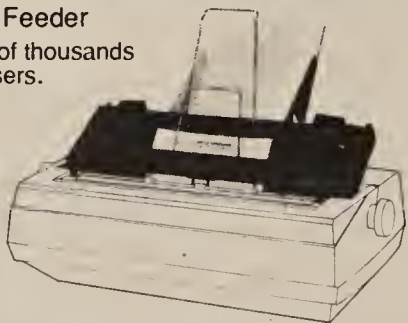
Horrigan is senior operations officer at the Maryland National Bank, Baltimore, Md.

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Food Firm Finds Office Automation Fortifying

By Rebecca Jones
Special to CW

MUNCIE, Ind. — In November 1973, Ball Corp., a diversified manufacturer of food and beverages, took its first step toward office automation. Ball employs approximately 11,280 people with manufacturing operations in 13 states and overseas.

A management consulting firm had just completed a study of the utilization of secretarial and clerical personnel at Ball headquarters here. The primary objectives of this study were to:

- Develop an effective utilization of administrative personnel.
- Determine a realistic and workable table of organization that would provide career path opportunities for administrative personnel.
- Provide the professional staff with the required secretarial support to meet day-to-day needs.

To accomplish these objectives, the consulting firm conducted a comprehensive review of all secretarial, clerical and administrative activities.

The methods used for data collection included a series of questionnaires completed by all secretarial, clerical, supervisory and management staff; and personal interviews with all executive personnel where amplification was needed.

Also, interviews and small group discussions with a 50% sampling of secretaries and clerical personnel were conducted to determine frequency and work characteristics of their particular jobs; and review of typing output to analyze the characteristics of typing effort in order to make recommendations on streamlining, consolidating or eliminating.

Also, task lists and time ladders were maintained by secretaries, supervisors and other clerical employees to determine staffing and a quantitative analysis of material typed during a typical month by secretarial and clerical personnel was carried out.

Survey Results

The results of the survey pointed out that there was a lack of coordinated supervision over total administrative and clerical work.

Each secretary established his own priorities and worked at his own pace. Work distribution was often inequitable and uncontrolled.

Peak work loads among departments were not coordinated in terms of the effective

utilization of idle or nonproductive secretaries and other clerical personnel.

The typing output of individual administrative personnel ranged from 18 to 33 lines per hour. The rate of typing for all secretarial/stenographic personnel averaged 50 lines per hour.

By comparison, industry-

'The methods used for data collection included a series of questionnaires completed by all secretarial, clerical, supervisory and management staff; and personal interviews with all executive personnel where amplification was needed.'

wide statistics show that personnel in a word processing center using stand-alone equipment are capable of

typing, at the very least, 150 finished lines per hour.

As a result of the findings, recommendations were

made to organize and staff an administrative zone on each operating floor in the new Ball headquarters building.

Each administrative zone would have a WP center designed to handle the typing requirements of the departments situated on its floor and, in addition, provide
(Continued on SR/70)

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'I seriously doubt that the CRT itself is responsible for certain stress problems.'

(Continued from SR/69)
back-up for word processing centers on other floors.

Prior to moving to the new headquarters building, two small WP centers were established in the executive and accounting areas. In March 1976, the administrative zone concept was fully implemented with the move to a new headquarters building.

In February 1978, Ball installed its first IBM ink jet

printer, which can merge information, print letters and envelopes in continuous fashion, format text and automatically change type faces.

The next development was to tie into the corporate computer in mid-1979 with an IBM software program called Advanced Text Management System (ATMS). This expanded the word processing capabilities and now gives Ball the ability to transmit

documents to certain other Ball locations using data processing's communications network.

In January 1980, the first remote installation was completed at a Colorado office center.

In June 1980, Ball began communicating via ATMS to Sunnyvale, Calif., at no additional cost to the company because existing equipment was used.

Using a ratio of secretaries to "headquarters population," 55 secretaries/clerk-typists would be required today — or a savings of 17 individuals.

Using a ratio of secretaries to "people requiring typing services," 82 secretaries/clerk-typists would be required today — or a savings of 44 individuals.

Concerning productivity, the average pages per month per typist in 1974 was 143. Today, the average WP operator produces 1,062 pages per month — or an increase of 643%.

Total savings using the word processing system is difficult to determine (that is, what is the value to executives for fast revisions, quick turnaround time or sending documents in seconds to and from other locations).

However, based on just the number of secretary/typists saved with the system, the annual savings is between \$70,000 (ratio of headquarters population to secretaries) and \$475,000 (ratio of people requiring typing services and secretaries).

Difficult Evaluation

It is also difficult to assign a value to the benefits of control. We have production reports that quantify typing output and any additional staffing and/or equipment requirements are based upon objective standards and supportive information.

In addition, the service center clerks do such tasks as filing and copying for several departments, thus saving on departmental overtime, temporary help or a full-time clerk to perform these activities.

Top management realized that with rapidly rising labor costs, increased demands on corporations by government and society, the paperwork explosion and new equipment technologies, new strategies had to be developed to control these administrative costs.

Word processing provided an opportunity to alleviate some of these concerns and top management support of the program is one of the reasons for its success.

Jones is manager of management support at Ball Corp., Muncie, Ind.

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Nancy B. Finn

Special to CW

Letters, letters and more letters...

Businesses today are inundated with letters — and memoranda — and reports.

According to studies, more than 85% of all business communications are carried on by means of the written word. Research has found that 15% of all business letters are written to clarify previously written letters that were unclear.

Studies have also found that more than one-third of total office costs involve the preparation, duplication, handling and storage of paper. U.S. industry currently has more than 265 billion documents in storage. The federal government has even more.

A report entitled "Records and Paperwork Management in the Federal Government: Two Decades of Recommendations," stated that as of mid-1950 there were more than 25 billion cubic feet of government records in existence and the annual cost to the government of records management approximated \$4 billion.

In short, paper and the communication of information via written formats, which accounts for more than half of the gross national product, have doubled since the 1950s.

Why Office Automation?

Why office automation? Put simply, most business managers would agree that without it they could not survive today and cope with the paperwork blizzard they have created.

Automating the office has been an evolutionary process — one that continues to change and modify as the technology develops. Business computers were originally thought of simply in terms of data processing. In the mid-1970s, someone realized that if you could store and manipulate a text representation of a program, then you could store and manipulate a text representation of a text. With the invention of the "miracle" silicon chip, the concept of bringing the computer out of the back room and into the front office became a cost-justifiable reality.

Word processing has been the first step in office automation. From single stand-alone units first purchased by most offices, there grew large word processing centers in which word process-

ing "secretaries" would sit at terminals for hours as managers pored over the balance sheets trying to figure out why productivity was not taking the quantum leap promised by the vendors.

It took a while before they realized that those early ex-

periments failed to address the fact that for office automation to succeed, a basic understanding of office structure is necessary.

Office managers are just beginning to realize that word processing is more than a replacement for the high-

speed typing necessary to handle transactions. As sophisticated automation takes hold in the office, managers are recognizing that there is a need for a greater understanding of the information manipulation that occurs.

No amount of fancy hard-

ware alone will succeed in an office if the initial task of looking at information management is not understood. The applications and use to which new office equipment is put depends upon the individual peculiarities of each

(Continued on SR/72)

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A Torotel Company

(Continued from SR/71)
office. A case in point is a large insurance company.

This company purchased its first piece of word processing equipment — a single stand-alone terminal — three years ago. No one person was assigned to the terminal and several individuals, including the department manager, were trained to use it. Everyone was encouraged to try the equipment. Within six

months of the first purchase, the rapidity with which paperwork was reduced led the department to add six terminals, three printers and a central processor. This equipment now handles 75% of the paperwork that this "paper factory" of a department generates.

Included among the reasons the managers of this company feel that office automation was successful for them are:

- No one is required to use the equipment or has been hired to work on the computer. Several employees were trained and they trained others. Everyone was invited to try the equipment and once they tried it, liked it.

- The terminals are not assigned specifically to particular individuals, but are shared by everyone in the department. No person sits at a terminal for more than

two hours at a stretch.

- Changes can be made in documents right up to the last minute without anyone having to retype an entire document.

- There were no changes in personnel due to the computer. No one was fired or transferred because of it.

- The rationale behind the particular system chosen was its ease of use. People were able to sit down at a terminal and almost immediately

could understand how to operate it. The self-paced manuals worked for this group.

- The system chosen has been relatively free of problems, thus little "downtime."

Additional Questions

Questions not anticipated when the initial purchase was made included:

- Compatibility with the IBM mainframe and data processing equipment and the complexity of providing modems that enable the word processing equipment to link to other data bases in the company.

- Learning about how to purchase supplies necessary for the computer system including paper, ribbons and disks. Initially they purchased supplies directly from the vendor, but there are less expensive ways to find these supplies.

- Determining how many terminals with screens were needed vs. how many typewriters could still do the job.

- Determining adequate maintenance controls and contractual arrangements.

Automation is reaching out to bring change, innovation and more efficient ways to process information.

In spite of all the predictions about the paperless office, however, society is a long way off from ridding itself of the "paper chase." In time, as electronic messaging becomes a greater part of the scheme of things, much of the paper will be eradicated.

The focus will be on the word, not on the processing. The challenge is, to be sure, that the communications are meaningful, useful and pave the way for greater understanding in the day-to-day conduct of business.

Finn is a lecturer at Boston University's School of Public Communication and director of Communication Resources, Needham, Mass.

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HARRIS

WP Now Brings 'Message Center' To Heart of Office Environment

By Barry Manz
Special to CW

Corporate Message Centers used to be areas within the building hidden from the mainstream where loud, obnoxious-looking machines methodically clanked out streams of copy; 50% of any selected message consisted of coding and routing information, and the rest contained the message, usually abbreviated like some wartime communications center. It was ugly and slow, but it worked.

But today, communicating word processors have brought the "message center" into the mainstream of the office environment. Consequently, today's telecommunication managers are beginning to realize that their responsibilities, too, are changing as message communications comes of age.

Enthusiastic, but Wary

Not surprisingly, the corporate response has been enthusiastic but wary, largely for two reasons: electronic message communications is not immediately recognized as an alternative to traditional message handling procedures, and an elaborate procedure required to send point-to-point communications between word processors has inhibited its adoption.

Today's corporate data communica-

tions networks are characterized by a paperwork arrangement, initiated piecemeal as new applications arise. By and large, companies develop data communications operations because of a need to feed data to a central computer facility by means of remote batch communications.

Generally, if message communications networks were implemented, they were kept separate from data communications, and regrettably were often limited to operating with obsolete teletypewriter terminals.

What is needed, then is a network that can:

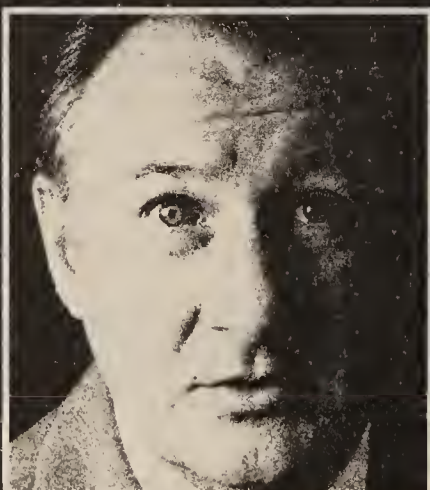
- Integrate a company's existing message systems with communicating word processors.
- Meet the organization's needs for distributed processing and other types of data processing systems while providing excellent message service.
- Evolve with the integrated network to accommodate new applications.
- Provide simple operation for use by personnel who are not trained in data processing or message handling.

Manz is public relations coordinator at MDS Systems, a Mohawk Data Sciences Division, Parsippany, N.J.

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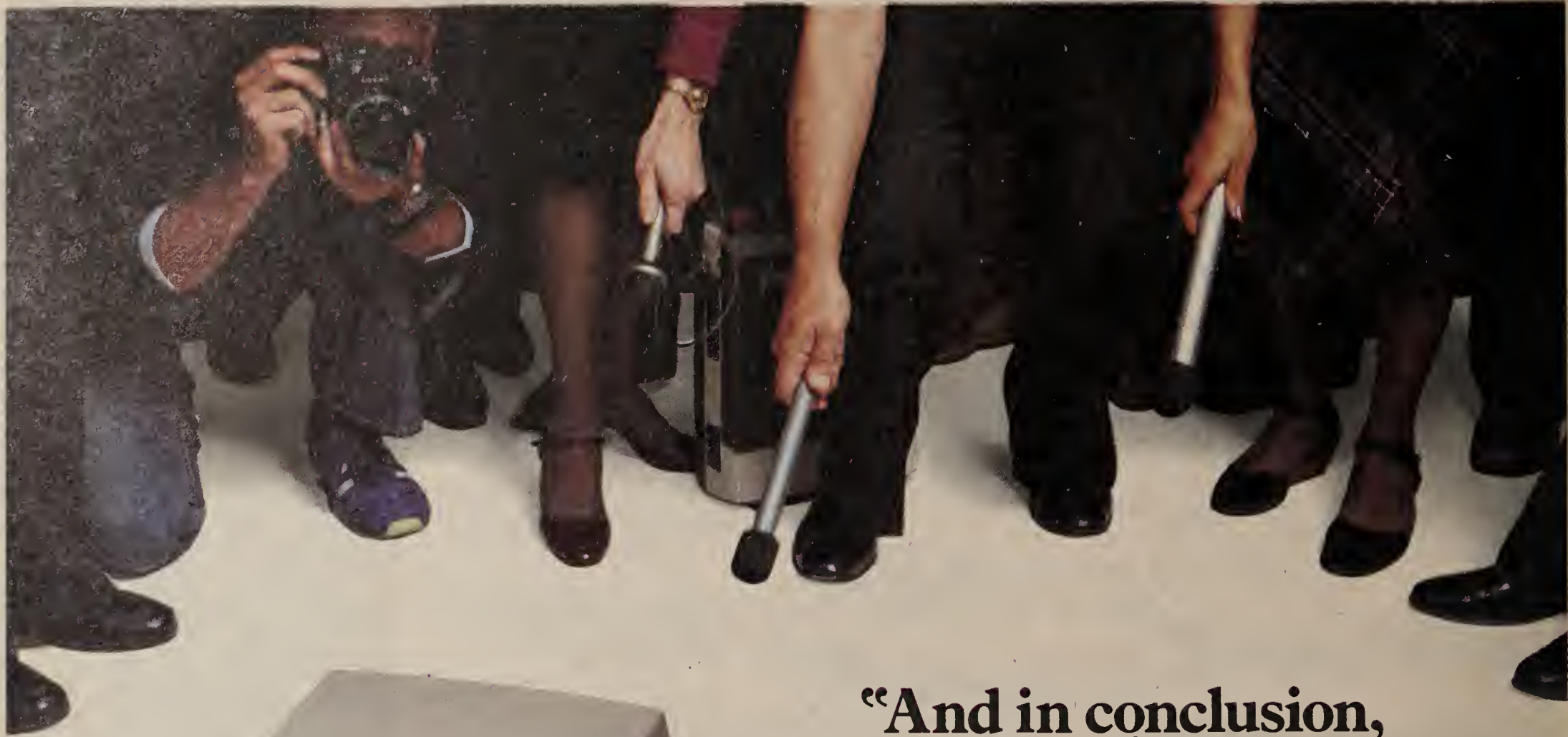
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Some Basic Rules Before Evaluating Software Packages

By Michael Shea
Special to CW

Many articles on the evaluation and purchase of packaged software systems have already been published. While the particular evaluation method is undeniably important, evaluation itself must be viewed as part of a larger process.

There are some basic rules that must be understood before software evaluation is even begun. These are common-sense, business-oriented guidelines that apply to any capital expenditure:

- First, the results to be achieved through the purchase must be defined.
- Second, a team that can deliver the

desired results must be assembled.

• Third, a consistent and orderly method must be used to evaluate alternatives and implement the best one.

These steps are not new or startling. But if they are indeed common business practice, why do so many projects involving packaged software result in either near or total failure?

Software should be perceived as a tool or product, not essentially different from any other product used by a client. The difference is that software is intangible. The client is buying an idea — a method of performing a specific func-

(Continued on Page 40)

Suggests Evaluation Team

Consultant Explores Selection Process

By Lois Paul
CW Staff

CHICAGO — The process of selecting an application software package requires a total commitment from management, input from a variety of groups within a company and a definition of requirements up front.

This was the message management consultant Allan F. Froehlich conveyed to those attending the recent Software Info here. Froehlich suggested that a four- to five-person evaluation team be formed that would reflect the variety of interests involved in the selection process. "I see a real plus in putting a user at the head of the team."

The evaluation team should tap other groups for input, such as application analysts, technical analysts, DP operations, performance analysts, controllers, and management, he said.

Froehlich stressed that software is only one of three components that must be considered. Hardware and people are as important as environmental considerations and the ideal is a good balance among all three elements, he added.

"In the life cycle of an application, about 60% of the overall

effort occurs after installation," he explained. He noted the importance of clearly defining the requirements before beginning the evaluation process. The organization should have a good grasp of its needs and expectations before talking with vendors, Froehlich added.

He suggested the use of three categories of requirements — mandatory, desirable and optional — and a process of assigning weights within these categories.

The next step is to send requests for proposals to between 12 and 15 vendors. The evaluation team should conduct an initial screening of those received and narrow the field to three or four semifinalists.

These proposals should receive detailed evaluation, including a vendor presentation and a thorough review of documentation, he continued. A checklist of requirements should be prepared, noting the category and weight of each;

and each vendor should be rated.

As necessary, benchmark tests should be performed and reference checks should be made via contact with 10 to 12 current users and visits to three or four if feasible, he said. Attendance at user group meetings also could be helpful.

At this stage, the scores for each package should be computed and evaluated. An added check would be to compute the

(Continued on Page 41)

Package Streamlines Loading

Management of IMS/VS Optimized

SAN FRANCISCO — A Program management optimizer for users of IBM's Information Management System/Virtual Storage (IMS/VS) has been introduced by Software Assist, Inc.

PMO/IMS was designed to streamline the process of loading IMS/VS on-line application programs for execution and to manage more effectively a program's use of real storage. PMO/IMS applies only to on-line MVS-based IMS/VS systems.

The optimized program loader feature of PMO/IMS uses optimally structured "core-image" libraries said to significantly impact the cost of loading a program.

The real storage optimizer (RSO) feature reportedly gathers information about real storage availability and the programs it manages. Using a heuristic algorithm, RSO then chooses how best to use real page frames based on the information it has analyzed.

Software Assist will provide

error correction service and a quarterly newsletter service as part of its maintenance program. For a nominal additional fee, users can opt for a three-month trial period to determine what features they need.

License fees begin at \$30,000 for a single CPU installation. The fee includes licensed machine readable material, two copies of a user's guide and a year's free maintenance. Software Assist is located at Suite 207-3048, 470 Castro St., San Francisco, Calif. 94114.

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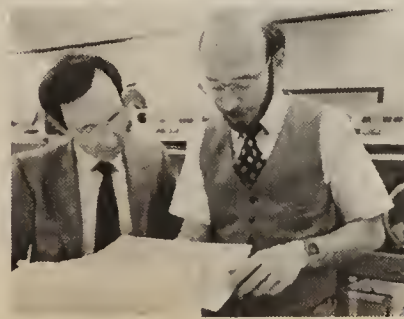
"It's just a tremendous tool. We use DOSSIER on our IBM 4341 to tell us all we need to know about file and program usage. Our programmers and analysts use DOSSIER constantly, day in and day out.

"I don't think there's a product to compare with DOSSIER. The Called Program Analysis facility

reads the object code in a program to find out whether another program uses it, rather than just looking at names. And this is really a very sophisticated thing to do.

"DOSSIER's given us a degree of control over documentation and standards we couldn't have achieved without many months of work.

"Frankly, I don't think we're using half of DOSSIER's capabilities, simply because we haven't had time yet. But I'm sure we will in the future. In fact, we're just starting to



implement the DOSSIER Library Audit, which looks like it's worth the package price alone."

Richard Amster is not alone in

his enthusiasm for DOSSIER. More than 900 customers currently use DOSSIER to clean up, maintain, and audit DOS, DOS/VS and DOS/VSE libraries. DOSSIER is also invaluable for conversions.

Try DOSSIER free, without obligation, for 30 days. For more information, just clip this coupon and mail to Computer Concepts, Inc., 6443 S.W. Beaverton Highway, Portland, Oregon 97221. Or call 503/297-4741.

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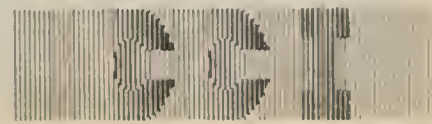
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Program Spools Print Data From CICS/VS to 'Power'

MINNEAPOLIS — B.I. Moyle Associates, Inc. has announced a software program said to accept print data from on-line IBM CICS/VS application programs and cause them to be spooled into the Power/VS queue.

Bimspoon 1.0 is a complementary package to the firm's Bimspool soft-

ware, which retrieves LST jobs from the Power/VS(E) batch spool queue, converts and prints on 3270 terminal printers under CICS/VS.

Multiple tasks reportedly can create batch print job output concurrently with Bimspoon because a scheduling mechanism is used to logically connect Power/VS spooled printer addresses under CICS/VS to the requesting tasks.

Bimspoon is said to address two print spooling requirements — batch printing under CICS/VS and, when used with Bimspool, provides an ability to spool output to terminal printers from on-line programs.

Bimspoon costs \$42/mo or \$420/year or can be purchased for \$840. The annual maintenance fee is \$105. B.I. Moyle is located at 4355 Lyndale Ave. S., Minneapolis, Minn. 55409.

HP Note Aids 'Image' Transfer

PALO ALTO, Calif. — Hewlett-Packard Co. is offering an application note that provides guidelines and procedures for transferring Image data bases back and forth between the HP 9845 computer system and an HP 1000 or HP 3000 computer.

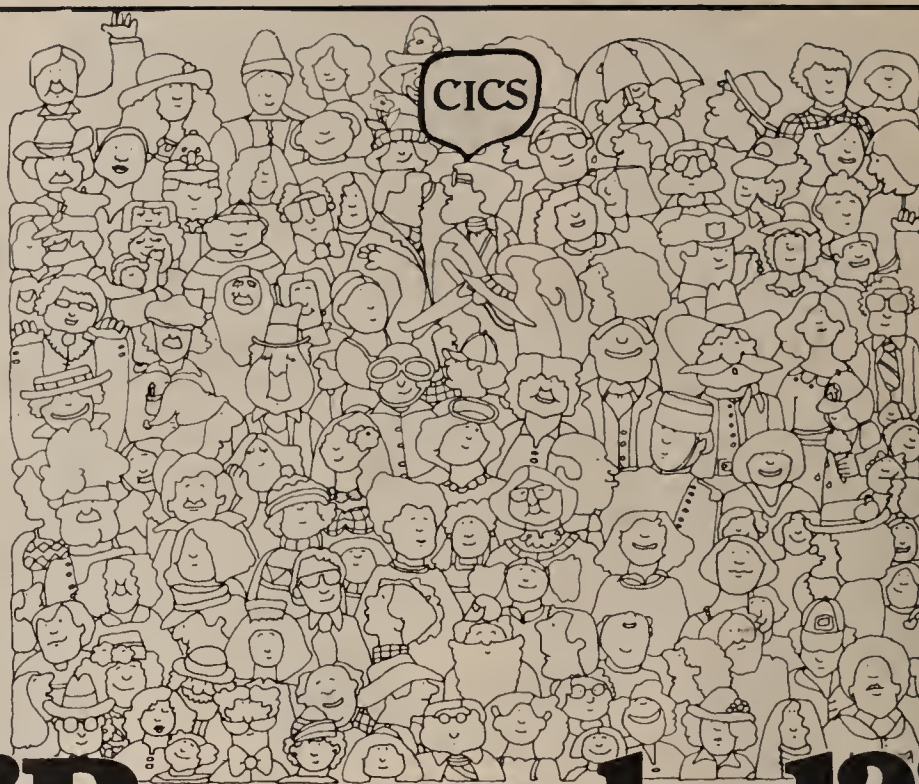
In addition to general procedures, this application note gives detailed explanations of the four Image transfers: Image/45 to Image/1000, Image/45 to Image/3000, Image/1000 to Image/45 and Image/3000 to Image/45. Also included are suggestions for creating a data base so it will be compatible with the destination system, as well as lists of the different equipment needed.

Application note 409, entitled "Transferring HP 9845 Image Data Bases," is available free from HP's Inquiries Manager, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

'PSDI Strudl' Out On a T/S Basis

DALLAS — A structural analysis and design program is being offered by University Computing Co. on a time-sharing basis.

PSDI Strudl, designed by Programs for Structural Design, Inc., consists of a problem-oriented input language and a set of processing programs. Strudl is transaction priced on a per-job basis, the vendor said from UCC Tower, Exchange Park, Dallas, Texas 75235.



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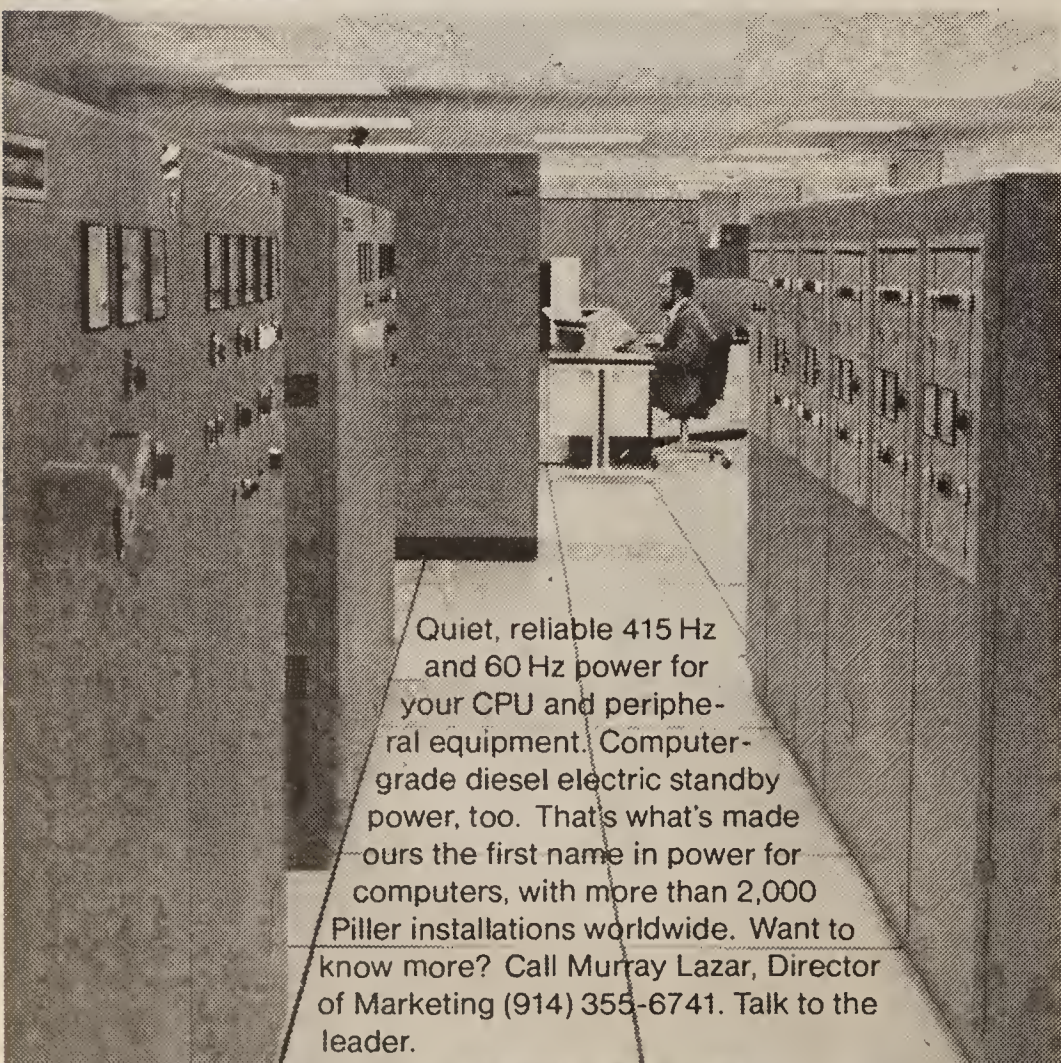
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Rules Apply Before Package Evaluation Begins

(Continued from Page 37)
tion. For this reason, software purchases tend to be justified differently than the purchase of tangible items like inventory or equipment.

But, the basic business fact is that software is bought for only one reason — to increase profits either by cutting expenses and/or increasing productivity.

Therefore, the first step in purchasing software is to define the benefits to be received in terms of measurable savings or productivity increases. If a benefit cannot be expressed in these terms,

then it should not be considered.

Next, build an experienced team that is committed to successfully completing the project. Including an outside consultant who can provide expertise and objectivity should be considered at this phase.

Shopping for what is being offered on the market is the next step and it is at this point that many projects run into trouble.

Vendors' lists of benefits may not agree with the prospective buyer's requirements and the clear and con-

cise requirements list can become vague. One reason is that some packages will provide additional benefits that were not specified in the original requirements list.

As these "extras" are identified, they should be quantified in terms of savings and productivity, but the evaluators must keep sight of the original requirements.

Remember that nearly every software contract contains a clause stating that the vendor does not warrant the system as fit for any particular purpose or use.

This means that the vendor is responsible for the system operating as designed and documented; but the seller is not responsible for how the purchaser uses the system. This position emphasizes the buyer's ultimate responsibility for determining which system is best for him.

Separate Price

Each system or service in the package should be priced separately to allow for individual cost/benefit analyses. Certain functions may not be applicable for some installations and these should not be automatically included and purchased.

For example, a one-week training course at the vendor's office may be as effective and less expensive than several weeks of on-site support by vendor personnel.

Reviewing the contract means that the prospective buyer should know exactly what is being delivered, its price and by whom it is being supplied.

The contract should be definite enough to determine responsibilities and liabilities for both parties, but not be so detailed as to become an administrative nightmare.

Payment should be contingent on some deliverable item or successful task completion. A substantial portion of the payment should depend on successfully installing and executing the software in a test environment.

After the package has operated in a relatively stable environment for a specified time period, a post-installation

evaluation should be conducted.

All too often, the project is deemed complete when software is installed and operational. In reality, it is complete only when the expected results, namely reduced expenses and increased productivity, are achieved.

This post-installation evaluation is usually not performed because the original requirements were ambiguous and did not allow for accurate measurement. If these are properly defined in terms of savings and/or pro-

ductivity, this evaluation is a relatively easy process. It is at this point that the purchase decision proves to be good, bad or somewhere in between.

If expected results have not been achieved, changes should be made. These may involve as minor an item as rewriting certain procedures.

The worst case is, of course, that the package cannot produce the desired results and the buyer has wasted time, money and effort.

Shea is a senior partner with Share Consulting Services in Cedar Rapids, Iowa.

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Unit Debugs System/34s

HOUSTON — Business Software Services, Inc. has introduced a programmer productivity Interactive Debugging Monitor for the IBM System/34.

The Interactive Debugging Monitor provides System/34 RPG-II programmers with most of the debugging facilities of the System/38, the vendor claimed, including setting breakpoints to stop program execution, examining the status of indicators and the contents of variables at any breakpoint and the ability to alter the breakpoints during execution, the vendor said.

The Interactive Debugging Monitor costs \$750 and is offered with a 30-day money-back guarantee. The firm can be reached through P.O. Box 42809, Houston, Texas 77042.

Tool Keeps Mail Lists

SPRING HOUSE, Pa. — A package that maintains a business prospect and mailing list on the IBM System/34 has been announced by Whelan Associates, Inc.

Written in RPG-II, the package interfaces with the CPU to print personal letters, the vendor said.

The package is priced at \$995 from Whelan Associates, P.O. Box 650, Gwynedd Plaza, A/E Center, Spring House, Pa. 19477.

Selection Discussed

(Continued from Page 37) score based on only those items deemed mandatory. This would uncover a vendor whose score is high, based on optional and desirable items, but low regarding items that were determined essential.

The evaluation team also should closely examine any gross scoring disparities, checking with members whose votes differed widely to learn the reason for this, Froehlich said.

Cost/benefit analysis, the next step, should be qualitative rather than quantitative, he explained, adding, "at any price a vendor may not have a good package for your requirements."

Figured into the cost should be maintenance and upkeep of the program, calculating the former at about 10% to 12% per year, he said.

"Be prepared to spend \$15,000 to \$25,000 in evaluation cost for a package costing between \$150,000 to \$200,000," according to Froehlich.

System/34 Gets 'Docuwriter'

SANTA ANA, Calif. — Application Development Services, Inc. has announced a document writing package for IBM System/34 users.

Called Docuwriter, the package was designed for users who have to print programs, system documentation, user manuals, proposals, in-house manuals or personnel manuals, but do not need a full-scale word processing system, the firm said.

Features include automatic pagination, tabulation capabilities, page heading capabilities and selective extraction of menu and program screens for insertion into documentation, the vendor said.

The package costs \$225, the vendor said from 1700 E. Dyer Road, Santa Ana, Calif. 92705.

CICS Map Facility Claims 75% Development Time Cut

DALLAS — Software Plus, Inc. has announced an on-line facility for creating CICS maps that is said to eliminate about 75% of the normal development time for map production.

Fastmap reportedly allows the user to "paint" the desired screen directly on the terminal and supply the necessary attributes to each field then automatically generates

the standard CICS/BMS code for that map, including a hard-copy print.

Software Plus is offering a 14-day free trial period for the package, which costs \$5,200 under a perpetual-use agreement or \$325/mo on a one-year lease.

The firm is located at Suite 1305, 13773 N. Central Expressway, Dallas, Texas 75243.



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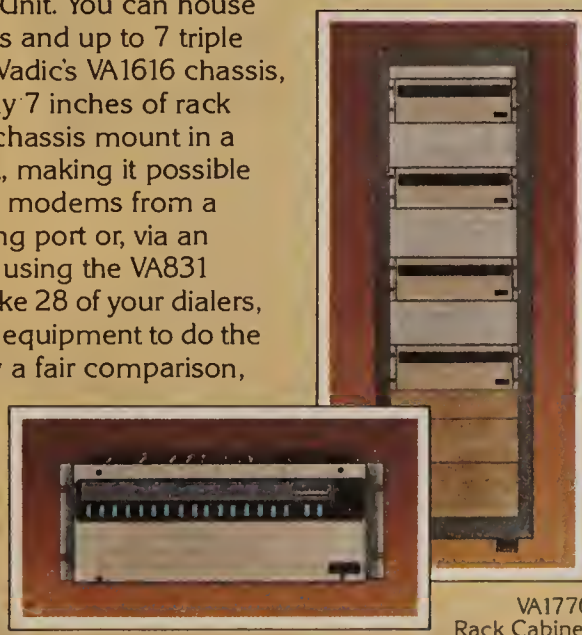
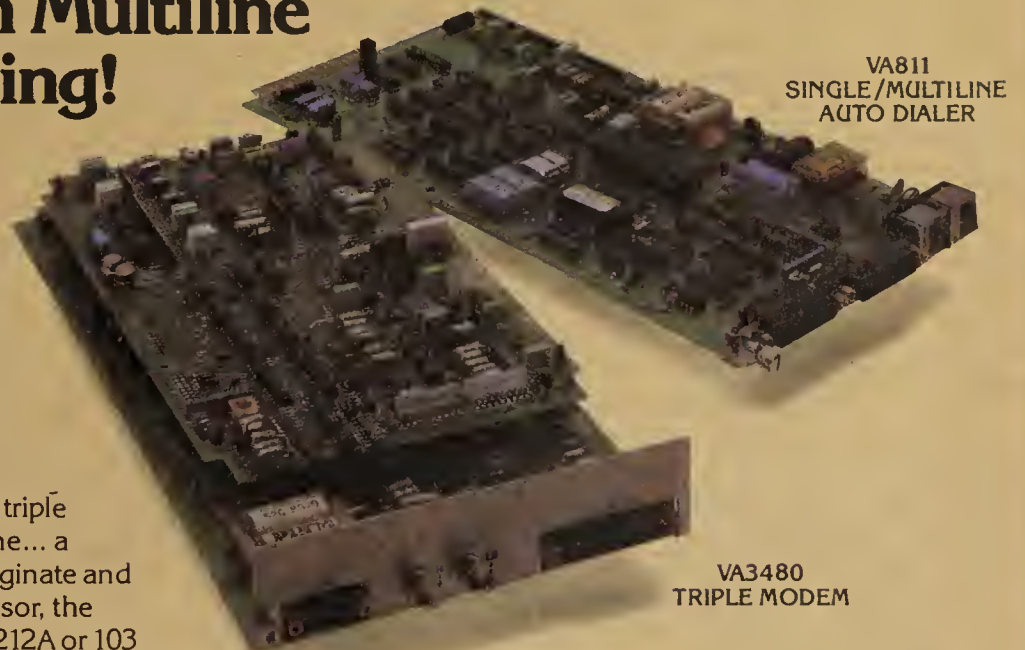
The two PC boards at the right are making it easy for computer sites to standardize on a single modem for all full duplex 1200 and 0-300 bps data transmission over your dial-up network.

Originate/Answer Triple Modem

First there's Racal-Vadic's new VA3480 triple modem. Actually, Ma, it's six modems in one... a VA3400, a 212A and a 103 with automatic originate and answer. Thanks to the built-in microprocessor, the VA3480 can automatically call any VA3400, 212A or 103 remote modem, with the central computer maintaining complete control, including selection of high or low speed modes, and modem ID. In the auto answer mode, the VA3480 changes into a VA3400, 212A or 103, depending on which type modem is calling. It's really a "do everything" modem, Ma.

Single/Multiline Automatic Dialer

The other card is the new VA811 Multiline Automatic Calling Unit. You can house one of these dialers and up to 7 triple modems in Racal-Vadic's VA1616 chassis, which takes up only 7 inches of rack height. 4 of these chassis mount in a 7-foot rack cabinet, making it possible to control 28 triple modems from a single RS366 dialing port or, via an RS232C interface, using the VA831 adapter. It would take 28 of your dialers, and many racks of equipment to do the same thing. Hardly a fair comparison, is it, Ma.



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For Isam File Management

'Dams' Runs Under DG's AOS

DUNSMUIR, Calif. — An Isam file management system running under Data General Corp.'s AOS/Extended Basic has been developed by Applied Business Systems, Inc.

The Data Management System (Dams) allows the use of keyed access files under AOS/Extended Basic by the use of the CALL statement to OPEN, CLOSE, READ,

WRITE, REWRITE, DELETE and SEARCH indexed files. It is reportedly compatible at the user, program source and data file levels with existing RDOS/DOS application systems using similar mechanisms.

The package is suited for users with applications systems that provide keyed file access under RDOS/DOS and who are converting to an

AOS operating system. Written in Assembly, the software features access via Basic calls.

The first two installations cost \$1,800 each, the next two installations cost \$1,200 each and subsequent installations cost \$900 each. For \$5,000, a user can outfit five installations, a spokesman said from 4350 Upper Soda Road, Dunsmuir, Calif. 96025.

Programming Tool Offered To Basic/Four Users

ATLANTA — A programming tool designed to generate and document software systems for Basic/Four Corp. computers without manual coding has been unveiled by Computer Software, Inc.

Auto-Soft is said to allow entry-level programmers to produce fully documented, standardized software "in one day," a spokesman for the company said.

To generate a maintenance or data entry program, the user types on a terminal exactly what the finished screen will look like.

Complete Program

From this input, Auto-Soft reportedly generates a complete program, file layouts and user documentation, the vendor said. Associated data files are automatically defined and programs are linked to menus for immediate selection.

Priced at \$10,000 including training, the package is compatible with Basic Four Standard CBS III Application Software. Computer Software, Inc. is located at 6675 Peachtree Industrial Blvd., Atlanta, Ga. 30360.

Business Package Introduced For Wang CPUs

POMPTON PLAINS, N.J. — Printers Software, Inc. has announced an integrated business management package for the Wang Laboratories, Inc. MVP 2200 processor.

Called PSI/Wang, the package was designed to give medium- to large-size graphics arts firms functions such as estimating, job costing, inventory control, word processing and accounting, the vendor said.

The package costs \$25,000. The vendor will also install the software as a turnkey consisting of a Wang MVP 2200 processor with 191K bytes of main memory, two CRT terminals, one 200 char./sec printer and 20M bytes of disk storage for \$60,000.

Printers Software is at 933 Rt. 23, Pompton Plains, N.J. 07444.

Modules Out For PDP-11s

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. has announced four modules of its planned 16-module manufacturing system for Digital Equipment Corp. PDP-11 minicomputers.

Shop Floor Control, Job Costing, Accounts Payable and Payroll are offered in Dibol-11 and are said to provide the necessary tools for a manufacturing firm to lower inventory investment, improve customer service and give quick inquiry response.

The Shop Floor Control module is priced at \$4,000 and the other three modules at \$2,000. Mini-Computer Business Applications, Inc. is located at 2441 Honolulu Ave., Montrose, Calif. 91020.

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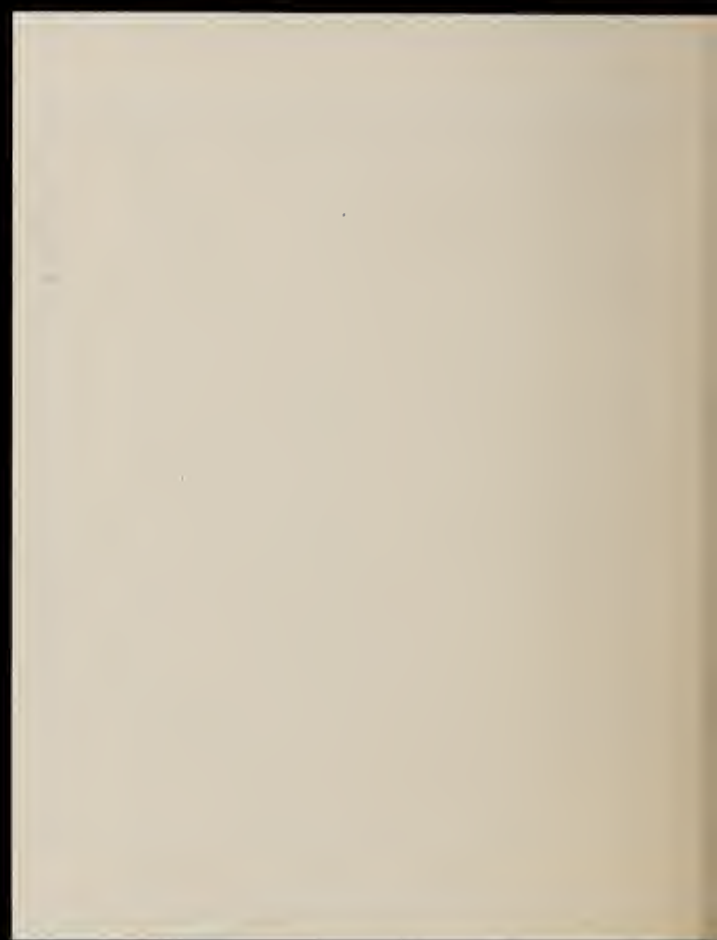
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Data Entry and Batch System Offered for HP 3000 Series

IRVINE, Calif. — A data entry and batch submission system for users of the Hewlett-Packard Co. 3000 series computers has been announced by Newport Software, Inc.

Capture/3000 gives data center management a standard interface between user-designed input forms, the data entry function and the batch job environment, the company said.

The system features single account manager control of data entry and batch job sub-

mission, automatic interface with new or existing user designed input forms, on-line display of batch status and on-line deletion of invalid batches, audit of all batches selected in batch jobs and

ports data entry performance reports generated automatically, the vendor said.

Capture/3000 costs \$6,500 from Newport Software, Inc., Suite 325, 19782 MacArthur Blvd., Irvine, Calif. 92715.

Business Packages Out For HP 3000 Computers

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) is offering a set of business pack-

ages for the Hewlett-Packard Co. 3000 computer.

The set includes payroll, accounts receivable, accounts payable, general ledger, order entry and sales analysis.

The packages offer menus and HP's Image Database Manager is used so that the packages are compatible with the use of Query for generating custom reports. The character mode screen handler, written by MCBA, allows formatted screens on any HP 2620 series or 2640 series terminal.

Frees CRT

Nearly all reports, though initiated interactively, are detached from the terminal, so the CRT terminal is free for other tasks, according to a company spokesman.

All the packages cost \$4,500 each with subsequent royalty fees of \$2,000 except for the sales analysis, which costs \$2,250 and has a royalty fee of \$1,000.

Quantity discounts are available from the vendor at 2441 Honolulu Ave., Montrose, Calif. 91020.

Data Design Enhances Accounting Tool

SUNNYVALE, Calif. — Data Design Associates, Inc. has expanded its Fixed Asset Accounting package in response to the recent changes in federal tax law.

The all-Cobol software now offers shorter cost recovery periods acceptable for tax purposes and incorporates the new rules associated with investment tax credit, investment credit recapture and depreciation capture, the company said.

The package meets the requirement of maintaining separate books for federal and state tax reporting, the vendor said.

Available for installation on most equipment supporting Ansi Cobol, the Fixed Asset Accounting package is priced from \$21,000 with options.

Data Design Associates is located at Suite 310, 1250 Oakmead Parkway, Sunnyvale, Calif. 94086.

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Program Development Aid Enhanced for Datapoints

NEWARK, N.J. — Marlboro Computer Corp. has announced Version 2.2 of its Program Development System, a combination screen design facility, extended data bus language and macro processor for Datapoint Corp. computers.

Version 2.2 includes 19 additional features such as looping constructs, array processing and file handling, the company said.

Program Development System is priced at \$2,950 from Marlboro Computer Corp., 810 Broad St., Newark, N.J. 07102.

'Topics' Release 2 Targets NCR System Users

CINCINNATI, Ohio — Intrak, Inc. has announced the second release of Topics, its program development system and financial package designed for NCR Corp. computers.

Release 2 contains improvements in system security, system flexibility, terminal support and in speed for sites experiencing heavy machine contention, the vendor said.

Topics is priced at \$5,000 and is marketed by the Software Clearing House, 771 Neeb Road, Cincinnati, Ohio 45238.

Interactive Graphics Tool Produces Simulation Output

WEST LAFAYETTE, Ind. — An interactive graphics software tool for producing visual displays of simulation output has been developed by

Random Notes

Pritsker & Associates, Inc.

Simchart was developed to simplify the presentation and analysis of "the often voluminous amount of data" associated with simulation models, a company spokesman said. Simchart allows the creation of plots, histograms, pie charts and pie graphs.

Available on a lease-only basis, the package costs \$5,000 for the first year and \$750 for each subsequent year. The firm can be reached at P.O. Box 2413, West Lafayette, Ind. 47906.

Medline Data Base Added To Dialog System

PALO ALTO, Calif. — Dialog Information Systems, Inc. has added the National Library of Medicine's Medline data base to its computerized reference system.

Medline corresponds to three printed indexes: Index Medicus, Index to Dental Literature and the International Nursing Index, the vendor said.

Searching the data base costs \$35/connect hour and 15 cent/full record with abstract. A citation only costs 75 cents, the vendor said from 3640 Hillview Ave., Palo Alto, Calif. 94304.

GE's 'Addata' Now Offered On International Network

ROCKVILLE, Md. — General Electric Information Services Co. has made its Addata marketing informa-

tion system available on its international teleprocessing network.

Addata is designed for sales and marketing analysis in the consumer and industrial products markets and enables marketing executives to retrieve and analyze decision-making data, the company said.

Addata can generate forecasts, selecting from quantitative methods ranging from simple exponential or harmonic smoothing to adaptive filtering, regression curve fitting and Box-Jenkins analysis, the vendor claimed.

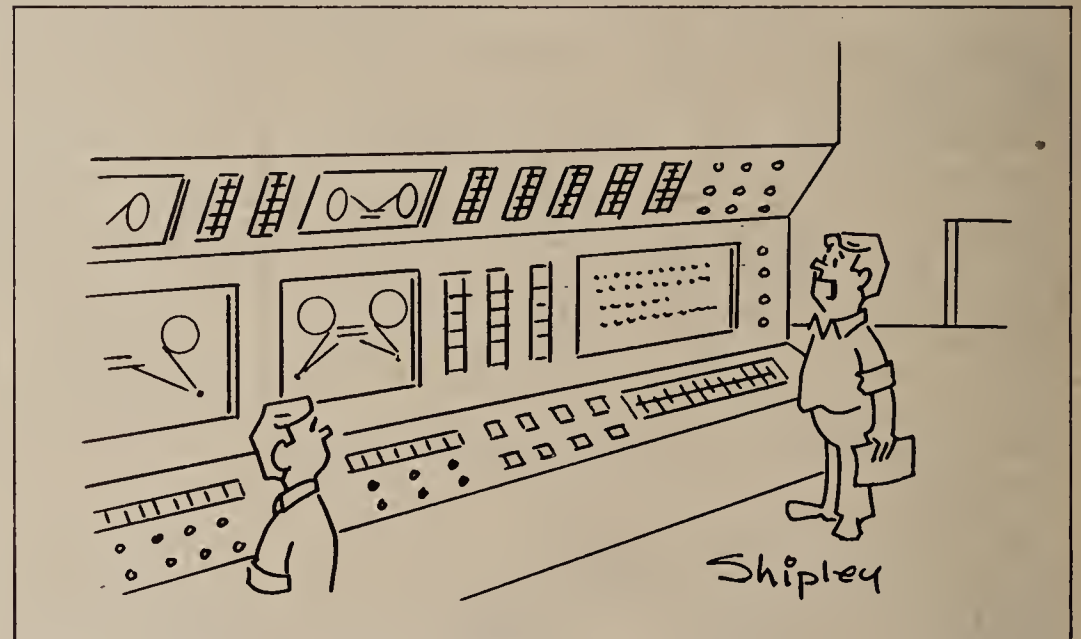
Transaction price information is available from General Electric Information Services Co., 401 N. Washington St., Rockville, Md. 20850.

CAD/CAM Software Runs On 32-Bit Systems

DENVER, Colo. — Autotrol Technology Corp. is offering a computer-aided design and manufacturing (CAD/CAM) software that also be purchased as a turnkey 32-bit graphics system.

The AD/380 is based on a Digital Equipment Corp. VAX-11/780 or 750 processor and can be used to perform complex engineering analysis, mathematical modeling, the vendor said.

For users who already have a VAX-11/780, Autotrol offers the CC-80 graphics workstation and the GS-32 mechanical design/numerical control software, which can be interfaced with the VAX processor. Packages cost around \$80,000, the vendor said from 12500 N. Washington St., Denver, Colo. 80233.



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Dec 3- 4 Detroit	Feb 11-12 Ottawa	Mar 18-19 Detroit
Dec 15-16 Washington	Feb 22-23 Washington	Apr 1- 2 Montreal
Jan 5- 6 Toronto	Mar 8- 9 Houston	Apr 5- 6 Toronto

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An intensive workshop on this major component of INFORMATION ENGINEERING - directed to User Management and DP staff who will be directly involved in an Information Analysis project. Covers (in case study detail) the powerful yet simple business-oriented steps of this technique for user-driven design of a logical data model.

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Cuts Costs for Rural Phone Company

Net Links Up Without Dedicated Lines

NORCROSS, Ga. — When the Northwest Ohio Computer Association wanted to centralize its network from a host computer and communicate with its 24 school districts, it had to do so through a small, rural telephone company.

Northwest Ohio Computer Association offers services to its secondary school districts from a computer center located at Four County Joint Vocational School in Four County, Ohio.

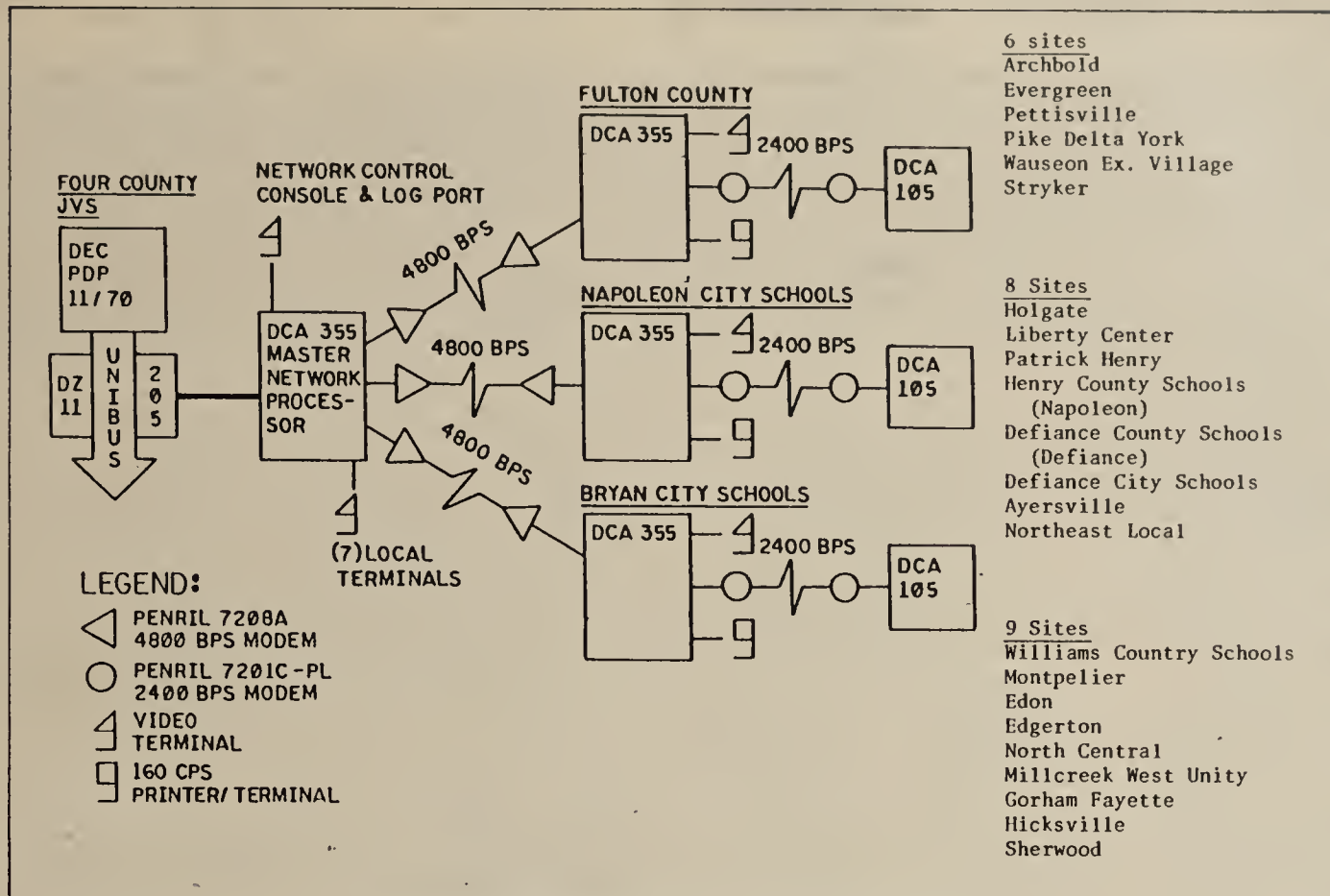
The association is a computer consortium consisting of representatives from each school district who initiated the system for financial, accounting and payroll purposes. Eventually, as the network expands, the system will be used for computer-based instruction.

In order to centralize the school districts from the host site, which uses a Digital Equipment Corp. PDP-11/70 computer, 26 dedicated lines would have had to be installed, resulting in a huge financial burden for the telephone company.

Unibus Interface

To provide computer service economically, Digital Communications Associates, Inc. (DCA) installed a System 205 Unibus Interface into the Unibus of the PDP-11/70, connected into a System 355 Master Network Processor and tied three dedicated lines from the Master System 355 to three remote System 355s at Fulton County, Napoleon City Schools and Bryan City Schools.

The System 355 at Fulton County serves six school districts. At each user site, a System 105 is configured to support four terminals. At Napoleon City Schools, the System 355 serves eight school districts with a System 105 communicating from each district. At Bryan City Schools, nine school districts are served by



Northwest Ohio Computer Association

one System 355. At this site, the nine 105s installed are served by one System 355 and are capable of supporting 36 terminals. Currently, Bryan City Schools

are using 18 terminals. These dial-up, asynchronous terminals are operating in speeds of 2,400 bit/sec while the dedicated lines between the Master

System 355 and the remote 355s are operating in speeds of 4,800 bit/sec.

DCA was able to configure (Continued on Page 48)

Local Net Ready for Small Users

HOLBROOK, N.Y. — A local-area network for small terminal systems has been unveiled by ElectroSound Systems, Inc.

The Data Loop Exchange (DLX) 10 is said to tie together data terminals, word processing workstations and personal computers for interconnection or communication with a common computer.

The local network is achieved without the need for adding components as new or enhanced software or protocols, a vendor spokesman noted.

Twisted-pair loop wiring makes installation easy and

eliminates the cost of modems and telephone lines, he added. The DLX 10 gives up to 10 terminals within a half-mile radius access to three computer ports. The half-mile limit can be extended by loop extenders.

Communication is independent of protocol, line discipline and mix of data rates. The network employs time division multiplexing to create multiple channels and is capable of an asynchronous aggregate rate of 153K bit/sec and a synchronous rate of 614K bit/sec.

Station data rate for asynchronous communication is up to

9,600 bit/sec; for synchronous communication, up to 19.2K bit/sec. The network uses the RS-232 communications interface.

Designed for small, start-up systems, the DLX 10 can be employed to integrate the many new computer-based tools used in factory and office automation.

The network consists of a controller, network interface units and the required computer port interfaces. It costs approximately \$10,000, ESI said from 725 Broadway Ave., Holbrook, N.Y. 17412.

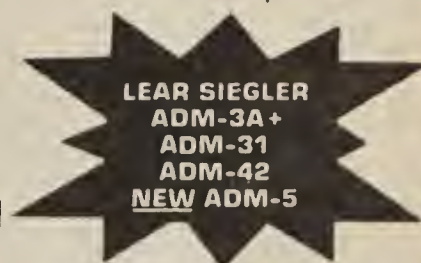
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CCI's X.25 Interface Certified For Tymnet, Telenet Nets

TORRANCE, Calif. — Computer Communications, Inc. (CCI) has announced its X.25 interface has been certified for use on the Tymnet and Telenet packet-switching data networks.

With this certification, CCI's X.25 support feature allows users to attach their existing asynchronous terminals to Telenet and Tymnet. A CC-8X communications processor with X.25 support is used to control the communications between the terminals, the public data network and the host computers.

The feature assumes full IBM 3705-type emulation processing functions and X.25 support in the same physical unit.

A CC-8X front-end processor supporting 15 asynchronous local lines, 16 binary synchronous communications lines and two X.25 line interfaces to Telenet or Tymnet rents for \$3,100/mo.

Further details are available from

IBM X.25 OK'd for Cylix

MEMPHIS, Tenn. — Users of IBM's recently announced X.25 interface will be able to use the nationwide transmission facilities of Cylix Communications Network, Cylix announced.

The statement was made after IBM representatives reviewed the network. The Cylix network offers high-speed data communications facilities to users in more than 300 U.S. cities.

Cylix is a subsidiary of Data Communications Corp. and is located at 3000 Directors Row, Memphis, Tenn. 38131.

CCI at 2610 Columbia St., Torrance, Calif. 90503.

Net Monitor Evaluates Reports

SALT LAKE CITY, Utah — Questronics, Inc. is offering a communications network performance monitor that monitors, evaluates and prints reports dealing with the data communications link and terminal response time.

The Model 400 is equipped to handle binary synchronous communica-


tions and synchronous data link control protocols. It can examine all transactions on a line, monitoring such parameters as response time, transmit and receive data, active terminals and active transaction ID.

The monitor costs \$3,500 from Questronics, 3565 S. W. Temple, Salt Lake City, Utah 84115.


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	Washington	Nov 16-18
	Washington	Oct 21-23
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	San Francisco	Nov 4-6
NETWORK MANAGEMENT	New York	Oct 21-23
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CORPORATE NETWORK ARCHITECTURES	San Francisco	Oct 28-30
	Washington	Nov 4-6
BUSINESS TELECOMM. I	New York	Oct 6-8
	Boston	Nov 2-4
	San Francisco	Nov 16-18
	Chicago	Dec 2-4
INTRODUCTION TO INTERNATIONAL TELECOMM.	New York	Oct 7-9
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	San Francisco	Dec 16-18
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PANSOPHIC

Network Shuns Dedicated Lines

(Continued from Page 45)

this network with existing trunk lines and facilities provided by six different small telephone companies using underground cabling.

The entire network communicates over one high-powered trunk link between the Master System 355 and the System 205 located in the Unibus of the host computer, according to a spokesman.

Main Advantage

Duane Baker, the DP manager of Four County, said, "One major benefit has been the cost savings generated by not having the tremendous expense of purchasing extra dedicated lines. By statistical multiplexing, we've eliminated these cost worries," he said.

"Another advantage of the DCA network is that it allows us to do our own diagnostics from our central site. From Four County, we can take a look at any data lines and tell exactly what is the status. We can troubleshoot here without having to travel to the remote sites. And our network runs from one end to the other approximately 70 miles," according to Baker.

"It is very important to us not to have to travel the distance just to detect where a problem is generated," he explained.

The DCA 355/205/105 network allows Four County to operate 26 remote sites from one central location resulting in significant time and cost efficiency.

Program Allows IBM 5280 to Emulate 5251

JEFFERSON CITY, Mo. — A program said to allow the IBM 5280 Distributed Data System to emulate the IBM 5251 Model 12 Remote Workstation has been announced by Software Systems, Inc.

The Emulator allows users to sign on to the host system and run any of the programs available to the users of a normal remote workstation or an in-house application, the company said.

The Emulator also supports a printer attached to the 5280 unit to allow for concurrent printing of host system reports, according to Software Systems.

The minimum 5280 configuration required is a 5285 or 5288 with 64K bytes of main memory, a 1,920 char-

acter display, typewriter keyboard and the communications adapter, the company said.

The Emulator is priced at \$500 for

the first CPU and \$400 for each thereafter from Software Systems, Inc., P.O. Box 1766, Jefferson City, Mo. 65102.

System Measures Bit Errors

CHELMSFORD, Mass. — A bit error measurement system for communications digital data links such as cable systems, radio links, fiber optics and related equipment is available from Tau-Tron, Inc.

The Berts-25 works from 100Hz to 25MHz and includes a real-time clock and built-in printer for long-term unattended tests, the vendor said.

The system includes a synthesizer-

controlled transmitter and an automatic receiver housed in a fully portable case weighing 32 pounds, Tau-Tron said.

Measurements include bit errors and bit error rate, determined and displayed simultaneously, according to the vendor.

The Berts-25 costs \$11,900 from Tau-Tron at 27 Industrial Ave., Chelmsford, Mass. 01824.



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RENTALS

Raytheon Announces Series Of Floppies for PTS/1220

NORWOOD, Mass. — Raytheon Data Systems Co. has announced a series of floppy disk drives for its PTS/1220 communications-oriented distributed processing system.

The Models 3831-3834 feature removable 8-in. diskettes, according to a spokesman.

The diskettes are two-sided, dual-density floppies with a recording density of 6,816 bit/in. and a formatted capacity of 1,025M bytes using IBM-standard format of 25 sectors at 256M bytes per sector, according to the spokesman.

The field upgrade diskette system (Model 3831) with controller,

adapter, expansion chassis and the first 1,025M-byte disk drive, cables and software costs \$4,100, the vendor said.

Model Costs

Models 3832 and 3834, which are field or factory installed third and fourth drives, cost \$1,650 each, according to the vendor.

The Model 3833 diskette expansion chassis and the third 1,025M-byte drive costs \$2,850, the vendor noted.

The vendor is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

Racal-Vadic Modem Runs 300 Bit/Sec in Full Duplex

SUNNYVALE, Calif. — Racal-Vadic, Inc. has unveiled a 300 bit/sec, direct-connect, full-duplex modem designed for computer site applications.

The VA315 can automatically or manually originate or answer calls and is capable of handling virtually all applications for full-duplex 0 to 300 bit/sec data transmission over the dial-up network. The modem is compatible with the following Bell modems: 103A, 103E, 103J, 113A, 113B, 113C and 113D.

The modem is also compatible with the vendor's Model VA811 single-line/multiline automatic calling unit, making it possible for a single

RS-366 or RS-232 computer port to provide automatic dialing for up to 60 VA315 modems, the vendor claimed.

The VA315 costs \$375 from Racal-Vadic at 222 Caspian Drive, Sunnyvale, Calif. 94086.

Racon Unveils Microwave Link

SEATTLE — Racon, Inc. has unveiled a microwave digital data link that provides simplex, transparent, asynchronous or synchronous data transmission for short-haul applications.

The Racon I is capable of transmitting data at rates from 300 bit/sec to 19.2K bit/sec. The system can be used as a full-duplex operation by installing two Racon I links to operate simultaneously over the same data path.

The product has differential I/O circuits with built-in line drivers. This enables optional data interface or business machine components to be remotely located up to 1,500 ft from the antenna.

The Racon costs \$3,125, Racon said from Boeing Field International, 8490 Perimeter Road S., Seattle, Wash. 98108.

(PLEX) to COBOL, PL/1, FORTRAN and Assembler. These extensions greatly facilitate their design efforts, freeing them to develop new applications as well as to update old. The Report Writer facility makes both on-line and batch reporting a routine and worry-free task. The discovery of PLEX's rich menu of powerful programming capabilities no doubt started the first bottle of champagne around.

End users were not forgotten in the software celebration. SYSTEM 2000/VSE DBMS provides QUEST, a free-form, English-like language that allows end users to create, update and retrieve data bases without programmer assistance. End users are also able to take advantage of Report Writer's wide-ranging capabilities. By providing end users with direct access to data, you further ease application backlogs and contribute to even greater programmer productivity.

Low maintenance

Unlike some additions to your DP shop, the SYSTEM 2000/VSE DBMS celebration does not stop after the glow of newness has worn off. It continues as you undertake daily maintenance chores.

You need never be apprehensive about changing your data base system, either in prototype or final form. SYSTEM 2000/VSE is a data dictionary-driven system, which means that the data administrator can develop and test prototype data bases at length before finalizing them. The Integrated Data Dictionary (IDD) ensures that, even after the data base is up and running, adjustments will not throw off the rest of the system in a "ripple effect".

SYSTEM 2000/VSE DBMS thus safeguards your ongoing application software investment by shielding it in a flexible framework capable of withstanding constant modification.

It's software that brings life to the party.

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And The Personal Mainframe is very easy to manage.

The DECsystem-10, for example, can provide automatic availability and network status reports every few minutes.

And the DECSYSTEM-20 features our new Bias Control, which balances the CPU dynamically—according to your administrative plan—for interactive, compute-bound and batch operations.

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LOS ANGELES — A host-controlled, stand-alone cash register for point-of-entry and point-of-sales (POS) operations is available from Micro-Z Corp.

The Z5000 uses a single Z80 board CPU with erasable programmable read-only memory and can interface with any computer employing synchronous or asynchronous modes of communications.

As a stand-alone terminal, it can be configured with its own peripherals. Other features include 128K bytes of addressable memory, magnetic strip reader, data cartridge recording capability, 32-char. alphanumeric display, slip printer and customer dis-

play. The terminal costs between \$1,500 and \$4,000, depending on configuration, Micro-Z Corp. said from 11754 Wilshire Blvd., Los Angeles, Calif. 90025.



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Storage for Univac 1100 7,000 Times Faster

CHATSWORTH, Calif. — Amperif Corp. has introduced two solid-state drum storage systems for Sperry Univac 1100 series computers that are said to provide access speeds 7,000 times faster than conventional flying head drums.

Demonstrated last week at the Federal Computer Conference in Washington, D.C., the Models SSD434 and SSD1782 drums incorporate 64K-byte random-access memory (RAM) chips and have an average data access time of 3 msec. The new technology chips reportedly help to eliminate latency or seek delays, which are common problems in rotating storage devices, a spokesman for the firm said.

The SSD434 drum is geared to replace four Univac FH432 storage devices, which reportedly have a data access time of 4,300 msec; and the SSD1782 replaces Univac's FH1782 that has a data access speed of 17,800 msec, the spokesman stated.

High Storage Capacity

The drums also boast storage capacities of 1M- and 2M words, respectively, in less space taken up by the Univac devices. Data transfer rates are automatically varied up to 333,000 word/sec to match host interface speeds, the spokesman added. This reportedly prevents the possibility of channel overruns and overall degradation of transfer time.

And because a solid-state drum's data is resident in RAM, drum users can immediately access information and eliminate missed rotational position signals normally associated with flying head drums or disk drives, according to the spokesman.

The Amperif drum devices have an error correction and detection feature that spots errors of up to three bits and corrects errors of one or two bits within a data word without CPU intervention. The units also have a display control for analysis of system performance and functions, the spokesman said.

Optional features include channel parity for Univac's 1100 CPU channels when required, a dual-access device that provides simultaneous access to any two solid-state drums in a subsystem and a shared peripheral interface that permits the drum to be attached to multiple channels for access by one or more CPUs.

The SSD434 and SSD1782 drums with Amperif's 5012 control processor cost \$242,500 and \$380,000, respectively.

Amperif is located at 21345 Lassen St., Chatsworth, Calif. 91311.

Emergency Power System Fits Mainframes and Minis

LOS ANGELES — Sweinhart Electric Co. has announced an emergency power system for mainframe and minicomputer sites. The unit provides electrical power to the computer power conditioner and computer room air conditioning unit in the event of a total power failure.

Designed as a fully automatic diesel engine/generator set, the unit is preassembled, prewired and designed to sense power

outages. It can start supplying power within 15 seconds after a failure, the vendor said.

The system comes with a UL listed and Computer Services Association-approved line transfer panel with adjustable time delays and sensors. It also includes an adjustable exercising timer and in-phase motor. Prices for the system start at \$23,000, the vendor said from 2900 E. Olympic Blvd., Los Angeles, Calif. 90023.

With No Time to Wait, Veteran IBM User Turns To Compatible CPU

By Tim Scannell
CW Staff

FRAMINGHAM, Mass. — How does a veteran user of IBM processors and equipment end up being the first user of another company's machine?

In a word, delays.

When Business Systems Associates, Inc. went shopping for computers about six years ago, it turned to IBM because of the firm's reputation and ability to deliver a system within a reasonable amount of time. The company acquired an IBM 360/40 for its service bureau business, which specialized in manufacturing and filed inventory tracking for electronics firms.

Throughout the years, the firm upgraded its computer power from the 360/40 to a 360/50, a 370/135 and eventually to a 370/145.

About two years ago, it faced another upgrade decision. But the company found that wanting the latest IBM equipment was a lot different from actually putting your hands on it.

Business Systems Associates

Printer Priced Under \$15,000

STAMFORD, Conn. — A 1,200-line/min band printer that costs under \$15,000 has been announced by Digital Associates Corp.

Manufactured by Data Printer Corp., the DAC 3121 Model band printer is said to combine advanced technology with a price/performance ratio of \$12/line.

Standard features are a fully enclosed, "quietized" cabinet, diagnostic LED status display, static eliminator, forms length selector switch, front and rear control panels and switch-selectable to 6- or 8 line/in., the vendor said.

The cost of the printer is \$14,975 from the firm at 1039 E. Main St., Stamford, Conn. 06902.

ordered a 4341 Group 1 processor "along with everybody else." It was put on a long waiting list for delivery. Frustrated, the firm turned to IPL Systems, Inc. of Waltham, Mass., a supplier of IBM 4300-compatible processors. After reviewing the pros and cons of waiting and receiving, the firm acquired IPL's 4443, the machine equivalent to IBM's hard-to-get 4341 Group 1 processor.

Difficult Decision

"We were jerked around by IBM pretty badly on the 4341 situation," Robert Lavin, Business Systems Associates vice-president, said. Even so, "it was a difficult decision back then to take the plunge away from IBM."

But "the second time around, it's easy," he said. The eight-year-old firm last month became the first user to install IPL's 4446, an equal to IBM's 4341 Group 2, which began initial shipments over the past two months. Because of its experience with IBM delays in the past, the firm did not even consider IBM when making plans for the recent systems upgrade.

Business Systems Associates is presently heavily into batch
(Continued on Page 54)

Conditioner Runs Under Micro

SAN DIEGO, Calif. — Topaz, Inc. has announced for computer sites a line of three-phase power conditioners that feature microprocessor control.

The units offer improved voltage regulation, greater flexibility and better protection against power sags, surges, brownouts and noise transients, the vendor claimed.

Features include data verification, system analysis, a warning alarm and light.

Units are available in power ratings from 10kVA to 100kVA. Prices begin at \$7,600, the vendor said from 9192 Topaz Way, San Diego, Calif. 92123.

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Veteran IBM User Turns To Compatible Processor

(Continued from Page 53)

processing and remote job entry and is also just starting to get into demanding on-line applications. Since most of its business involves electronics firms that use the service bureau's facilities to keep track of highly volatile inventory supplies, the firm could not afford to lose a lot of time switching from one processor to the next. So although immediate shipment and installation was a priority, dependability was crucial to the system's acceptance.

Also, since the very beginning, Business Systems Associates has shared its computer installation with a second company, Data Distributors,

Inc., a software distributor located in nearby Hopkinton, Mass. Therefore, it was not the only one involved in the processor addition.

According to Lavin, IPL was up front about the whole situation from the beginning. The firm agreed to do their best to install the more powerful 4446 processor, but warned Lavin to be prepared for any number problems that might present themselves during the mainframe switch.

However, IPL did take a few precautions to limit the number of problems, Lavin said. Like most companies involved in a first-user situation, IPL dedicated a sizable amount of its technical force to the premier system's installation.

"They've got a lot of technical talent that was available on the micro-code side if there was a bug and on the operating system if there were any problems," Lavin claimed.

IPL then went a step further and installed a special switching device, at a cost to them of about \$20,000, that would allow the service to make an immediate switch to its old processor if anything failed on the new machine. The channel-type switch, which linked both the 4443 and the 4446 to a single box, was installed "just to guarantee our comfort in the situation," Lavin pointed out.

Naturally, the vice-president and his associates were apprehensive about being the first user of even a familiar computer system. But the switch and IPL's technical expertise helped to alleviate a lot of the firm's doubt.

The IPL 4446 was installed on Aug. 21 and was up and running a few hours later, Lavin said. The only difficulty was a timing error, which was fixed the first day the system was installed. The firm is now using both the 4443 and the new 4446, running under IBM's VM, DOS/VSE and CMS software.

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For Small Business, Corporate Users

Model 110 Puts CDC in Micro Race

MINNEAPOLIS — Control Data Corp. has become the latest to enter the microcomputer-with-big-data-base-access-capabilities sweepstakes. The processor is aimed at two markets: the small business user and the large-scale corporate training markets.

CDC's 110 is a Z80-based system that sports a base price of around \$5,000 and offers 64K bytes of main memory, an 8-in. flexible disk subsystem with 1.2M bytes of storage, or a maximum of 2.4M bytes of storage, with double-density disks.

Workstations with the capabilities of a personal computer and the ability to access larger data bases appear to be the current popular niche for small business systems. IBM opened the door to the market several months ago with its Personal Computer. Other large mainframers such as Sperry Univac are working on similar products.

The key selling points of the 110 center around CDC's established computer service networks, Cybernet and Call 370. The 110 can access, via modems, both as a dumb terminal to perform I/O type functions and in a similar fashion as a teletypewriter.

However, the 110 does not offer local intelligence or the ability to be driven by Cybernet

SMS Mixes Winchester And Floppy

MOUNTAIN VIEW, Calif. — Scientific Micro Systems (SMS), Inc. is offering Winchester/floppy storage systems that are available on a wide range of host microcomputers and provide up to 39M bytes of formatted storage.

The FWT series allows users to choose plug-compatible interfaces for Digital Equipment Corp. PDP-11 and LSI-11, Intel Corp. Multibus and a general purpose byte parallel interface. Each system includes a choice of an 8.9M-, 17.8M-, 26.7M- or 35.6M- byte 8-in. Winchester disk storage, plus a 1M-byte IBM-compatible double-sided floppy diskette.

Maximum transfer rates of 543K byte/sec are possible, SMS said. The floppy diskettes require less than 60 seconds to transfer 1.2M bytes of data to or from the Winchester disk.

The SMS "Minute per M/byte" solution allows an operator to back up 8.9M bytes in less than eight minutes including insertion and removal time, the firm claimed.

Prices for FWT series systems start at \$6,200 from the firm at 777 E. Middlefield Road, Mountain View, Calif. 94043.

System Characteristics	IBM Personal Computer	Control Data Corp. 110	Radio Shack TRS-80 II	Radio Shack TRS-80 III	Xerox Corp. 820	Commodore Inc. Pet	Apple Computer, Inc. Apple II
Minimum Configuration ¹	16K Cassette B&W Monitor	64K 1 Diskette B&W Monitor	4K Cassette B&W Monitor	48K 2 Diskette B&W Monitor	64K 2 Diskette B&W Monitor	32K Printer 1 Diskette B&W Monitor	48K 2 Diskette B&W Monitor
Minimum Configuration Price ²	\$1,565	\$4,995	\$399	\$700	\$2,995	\$2,000	\$3,625
Memory Range	16K-256K	64K	4K-64K	4K-64K	16K-64K	4K-32K	32K-64K
Standard Configuration Price ³	\$4,425	\$7,995 ⁴	\$4,727	\$3,972	\$6,095	\$2,900	\$3,825
Maximum Number Of Disk Drives	2	2	4	4	2	6	6
Operating System	DOS CP/M-86 Used P-System	CP/M	TRS-DOS	TRS-DOS	CP/M	Pet	DOS
Languages	Basic Pascal	CBasic Pascal MBasic	Cobol Fortran Basic	Cobol Fortran Basic	Basic	Basic	Basic Pascal Fortran
Visicalc Support?	Yes	No	Yes	Yes	Yes	Yes	Yes
Word Processing Support?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1. Minimum configuration based on vendor recommendations for a minimum workable configuration.

2. Based on retail prices in the Boston area.

3. Based on retail prices in the Boston area for a 64K byte processor, operating system, two diskette units, one printer and a black and white display unit.

4. The CDC configuration includes an 80 char./sec. dot matrix printer, Basic and two applications, the vendor said.

Sources: CDC, IBM and The Yankee Group

A Lineup of Micros That Offer Business Applications

or Call 370 applications. But a spokesman said the potential for more complex applications does exist and should not be ruled out as part of a future announcement. The 110 is also capable of accessing CDC's Plato computer-assisted education network — a long-time pet project of chief executive officer William Norris — and will be marketed through the firm's Educational Sales Force.

To sweeten the educational pot, CDC also announced two education packages: a real estate sales production system, which will be available in October, and an accounting package

available in early 1982, CDC said. CDC said it plans to market the 110 with equal vigor to both the small business and education markets.

Supports CP/M

The 110 supports the CP/M operating system and CDC is offering C Basic, Pascal and Microsoft Basic programming languages. CDC has also contracted with Peachtree Software, Inc., a division of Management Sciences America, to use its Magic I word processing package, CDC said.

So far, CDC is not offering Visicalc, a management problem-

solving package from Unlimited Software, Inc., but the firm has not ruled out the possibility of Visicalc support, according to Harry Benjamin, general manager of product development. Benjamin added the 110 is capable of Visicalc support.

A basic 110 with 64K bytes of main memory, one diskette, operating system and a black-and-white monitor costs \$4,995. A processor with two diskettes, an 80 char./sec printer and two applications costs \$7,995.

Business and education applications can be purchased separately and cost between \$625 and \$4,000.

Mini Bits

Transfer Switches Link Six Peripherals

SANTA CLARA, Calif. — Transfer switches said to allow the connection of up to six peripherals to a single CPU port without rewiring have been announced by International Mini-computer Accessories Corp. (In-mac).

The 25-line RS-232 cable transfer switches range from \$175 to \$260, depending on whether two, three, four, five or six ports are featured.

Two-port T-switches for 9- and 15-line RS-232 cables, 37-line RS-449 cables and equipment with 50-pin cables/connectors, cost \$165 to \$225. In-mac noted from Department 18, 2465 Augustine Drive, Santa Clara, Calif. 95051.

Dilog Controller Interfaces With LSI-11

GARDEN GROVE, Calif. — An intelligent Winchester hard

disk controller that interfaces two Seagate Technology ST506 or ST512-compatible disk drives on Digital Equipment Corp. LSI-11-, 11/2- or 11/23-based computer systems has been unveiled by Distributed Logic Corp. (Dilog).

The Model DQ604 runs under DEC's RT-11 and RSX-11 operating systems using standard DEC RL01/RL02 drivers.

The controller costs \$2,050 from the firm at 12800 Garden Grove Blvd., Garden Grove, Calif. 92643.

Turnkey Assists Real Estate Brokers

MINNEAPOLIS — International Graphics, a division of Moore Business Forms, Inc., has announced the Broker Management System, a turnkey system for real estate brokers.

Based on a Digital Equipment Corp. PDP-11/23, the system performs listing management,

client follow-up, source of sales, commission accounting, accounts payable, general ledger and other functions.

A standard configuration costs approximately \$25,000, the vendor said from 1660 S. Highway 100, Minneapolis, Minn. 55416.

Naked Mini Offers I/O Boards for Scout

IRVINE, Calif. — Computer Automation, Inc.'s Naked Mini division has introduced two- and four-channel asynchronous serial I/O boards that are said to lower the price per asynchronous channel for its Scout microcomputers.

The interfaces, which boast RS-232 and RS-422 communications capabilities, effectively lower the cost of each channel from \$270 in a single-channel board to about \$97 per channel in the four-channel model.

CA's Naked Mini division is located at 18651 Von Karman, Irvine, Calif. 92713.

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Wescon/81: Bigger, Better — Largest Ever

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — A large number of product introductions, record-breaking attendance figures and an increased emphasis on business and professional applications gave an added slice of vitality to this year's Wescon.

Over 67,000 people registered to attend the event, making it the largest Wescon ever. The highest previous attendance was 53,103 at Anaheim, Calif., in 1980. Almost 1,000 exhibitions sprawled across every available piece of space in San Francisco's Civic Auditorium, Brooks Hall and Hilton Hotel.

Trade officials from the People's Republic of China were on hand for the first time at a U.S. electronics show to answer questions about the potential Chinese market for U.S. exports. Although Chinese technology is considered by industry pundits to be way behind that of the U.S., some commentators were warning last week that the gap between the two countries was closing fast. "The Chinese have gone from being 25 years behind us to an eight-year lag in perhaps less than a decade," said Richard Norton of Lawrence Crow Electronics of Dallas.

Emphasis on Success

Another first for the show was a conscious drift away from the normal concentration on technical topics towards more emphasis on how to succeed in electronics in today's business atmosphere. Seminar topics ranged from offshore manufacturing in the 1980s to the small business climate in California. There were also seminar sessions dealing with such hitherto esoteric subjects as how to deal with the legal pitfalls of innovation, technology to help the handicapped and strategies for computer industry product marketing.

At the same time, there was the usual preponderance of technical presentations in areas such as speech and voice processing, high-speed digital systems, microprocessors and microcomputers and digital signal processing.

The show, which alternates every year between the San Francisco and Los Angeles areas, is sponsored jointly by the Institute of Electrical and Electronics Engineers and the Electronic Representatives Association.

The show's one-millionth attendee, James A. Weil, a systems engineer at Kevex Corp., Foster City, Calif., was presented with a lifetime admission credential to Wescon and an Apple Computer, Inc. Apple II computer to commemorate the event's 30-year existence.

DP Manufacturers Seen Forced Into Greater Offshore Production

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — High growth in world markets for computer goods and services and the need to keep labor costs competitive will force many manufacturers to set up offshore supply networks during the 1980s.

That was the consensus at a seminar session on "Manufacturing Offshore in the 1980s" at

this year's Wescon/81 electronics exhibition and convention.

Superior marketing intelligence, well-focused long-range research, international rationalization of design and production and a concentration on the markets of less-developed countries were the keys to success, the audience of data processing professionals was told.

In a paper presented to the session, Warren E. Davies, di-

rector of government relations at the Semiconductor Industry Association, Cupertino, Calif., said equipment such as Brazilian minicomputers and Korean video disks would increasingly challenge the dominance of manufacturers like IBM, Texas Instruments, Inc., NEC Information Systems, Inc. and Siemens Corp.

"American manufacturers can look towards joint ventures with Asian firms to install fully integrated automated processes to penetrate the burgeoning Asia market or with Brazilian or Mexican firms to assess an increasingly attractive Latin American market," Davies said.

"To solve problems of scarcity of engineering talent, American companies can form joint-venture designs to cross-license technology with firms in the newly emerging status and draw upon their expertise to produce computer-aided designs of very large-scale integrated circuits and possibly even more exotic generations of the future," he added.

Talking about the range of possibilities in building up an offshore strategy, Richard Bolin, president of International Parks, Inc. of Flagstaff, Ariz., said vendors face the choice of whether to own or subcontract plants abroad. This would depend on the company's evaluation of its own market opportunity, the size of the intended operation, risk appraisal, the level of technology, sensitivity to transport and effects on resources.

Bolin said computer firms go offshore for two principal reasons: to reach external markets that cannot be satisfied in any other way, and to reduce their cost of manufacturing through

(Continued on Page 62)

IBM Details Technique Increasing Chip Circuits

SAN FRANCISCO — An experimental circuit design technique that could have far-reaching effects on computer power memory and storage devices was described by two IBM engineers at the recent Wescon/81 here.

Using saturated transistors as capacitors rather than as traditional switching elements, the engineers — Jack Dorler and Joseph Mosley — claim up to 10,000 high-performance logic circuits could be placed on a computer chip. And applied to memory decode circuits, the effect is expected to improve speed and reduce power by more than one-third.

Presenting a paper on the technique at a Wescon session on "Very High-Speed Digital Large-Scale Integration," Dorler said the typical approach to integrating two terminal capacitors required large areas of space — an item in short supply in today's high-technology world.

"Until now, saturating a transistor has been considered incompatible with the use of fast circuits. However, when the

saturated transistor is employed as a capacitor rather than as a switched element, an appreciable amount of capacitance is achieved for little cost in power," Dorler stated. A transistor is saturated when both the emitter junction and the collector are biased in a forward direction using the "on" condition.

Important Improvements

The engineers asserted that as the rate of semiconductor process technology matures, improvements in circuit design are becoming increasingly important. New ways to improve circuit efficiency must be employed. IBM claimed the Dorler-Mosley effect improves efficiency because power is spent most during transitions. Until now, circuit designers have avoided the saturated technique because under most circumstances it led to considerable delays.

The technique, known as the Dorler-Mosley Saturated Transistor Effect, was developed at IBM's General Technology Di-

(Continued on Page 62)

First 'Plug-Compatible' Show

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — The first-ever show exclusively for the plug-compatible computer products industry was held here to coincide with the popular Wescon/81 convention.

Compat '81 featured several of the industry's largest peripheral manufacturers, including Control Data Corp., National Semiconductor Corp. and Mostek Corp. Twenty seminar sessions at the San Franciscan Hotel dealt with such subjects as software, controllers, the future for mass storage and I/O peripherals.

One interesting product announcement at the show was made by Data Systems Services (DSS) of El Toro, Calif., which unwrapped a disk controller for the Digital Equipment Corp. PDP-11. DSS claimed the product — the DSS70M — goes for half the price of a similar DEC product and offers quicker throughput for the end user.

Among features claimed for the DSS70M was the capability to eliminate DEC's DLC controller and RH70 interface, thus reputedly lowering system costs. DSS said it is also transparent

to DEC software and is the only embedded controller currently on the market that can support up to eight 600M-byte disk drives.

The new controller will be available within 60 days; its single-unit price is \$8,000.

Apart from DSS, several other manufacturers displayed their latest peripherals, controllers and software packages designed to interface with DEC, Data General Corp., Hewlett-Packard Co. and IBM equipment. For example, Distributed Computer Systems of Waltham, Mass., showed its DCS/86, a 16-bit microcomputer designed for applications such as data communications, computer graphics, industrial and process control. And in the area of display terminals, Emulog, Inc., of Fremont, Calif., presented its LOG 53 model, designed to emulate DG's 6053 display terminal.

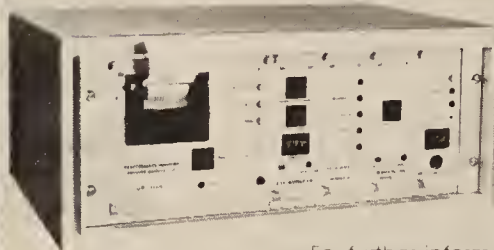
The aim of Compat was to recognize the burgeoning nature of the compatible peripherals industry by bringing together manufacturers, distributors and systems engineers seeking information about compatible computer products and services. A second show has been scheduled for Feb. 16-17 in Anaheim, Calif.

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Industry Spokesmen Take Strong Exception to Bill To End Procurement Fraud

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — DP industry spokesmen took strong exception with legislation to eliminate fraud in federal procurement programs, saying the bill is so broad it would not accomplish its objectives and would unnecessarily jeopardize innocent contractors.

The bill, H.R. 2580, would mandate severe penalties for failure to provide complete and accurate contract information, but representatives of the Computer and Communications Industry Association (CCIA) and the Computer and Business Equipment Manufacturers Association (Cbema) told a House subcommittee recently that the General Services Administration (GSA) contracting procedures are often so complex and vague that contractors might be penalized for legitimate activities.

"With its broad sweep, the bill indiscriminately mandates enormous penalties for any nondisclosure, however innocent, of so-called material information," CCIA Counsel David S. Cohen told a House government activities panel Sept. 15.

"Penalties may be imposed for innocent nondisclosure, honest mistakes, good faith reliance on GSA instructions, negligent nondisclosure or fraud," he noted, saying the scope of the bill is "of enormous concern."

"Government contracts contain a

plethora of informational requirements," he said, "Some are clearly set forth in the contract. Other disclosure requirements are expressed in language which is so ambiguous that even GSA does not know what must be disclosed."

Cohen called the stiff penalties in the bill "unconscionable" fines of three to five times the government's damages, plus additional damage amounts and less from government contracting privileges — all, he said, "for not disclosing information, which GSA did not clearly identify as material."

Raising many of the same points, Cbema President Vico E. Henriques told the subcommittee. "we question the practicality and the fairness of such a [disclosure] certification requirement in the conduct of complex procurements of high technology equipment, as provided by our industry."

The bill's penalty provisions also raise serious questions of due process of law, Henriques said, arguing such harsh penalties should be applied only by the courts and not administratively by GSA.

"A contracting office is not a cop," remarked CCIA's Cohen. He suggested it would be more productive to strengthen the Justice Department's GSA task force.

The association spokesman also took exception with a number of additional provisions in the legislation, particularly its sections on auditing procedures and access to contractor corporate information.

In general, Henriques said, the bill "does not address the real issues within GSA," which he said suffers from "a significant lack of effective management and a lack of sufficiently trained contracting officers."

Software Firms Invited to China

PALO ALTO, Calif. — Software vendors offering manufacturing control turnkey packages are being invited to attend a software trade fair next spring in the Peoples Republic of China.

The show will run 12 days in Beijing and 12 days in Shanghai.

Each of 12 vendors will be given one day in Beijing and one day Shanghai to present their turnkey software to decision makers in the Fourth Ministry of Industry, the State Administration of Computer Industry and the China Computer Technical Service Corp.

Eric Garrigue Vesely, a consultant in Palo Alto, Calif., is organizing the trade fair under the authorization of Ouyang Zhineng, president of the China Computer Technical Service Corp. The idea for the fair came out of a presentation made by U.S. computer marketing representatives before the State Administration of Computer Industry in Beijing, China, on Aug. 10.

Based on this meeting, the group recommended that the first specific theme trade show be devoted to demonstrating turnkey manufacturing software such as master scheduling, inventory control, bill of material and purchase order control.

Information on arrangements and participation in the trade fair is available from Vesely at 1220 Hamilton Ave., Palo Alto, Calif. 94301.

Nickels & Dimes

Cullinane Database Systems, Inc. has declared a two-for-one stock split, payable Oct. 26 to shareholders of record Oct. 1.

\$\$\$

AGS Computers, Inc. has declared a two-for-one stock dividend to be paid Oct. 1 to shareholders of record Sept. 15.

\$\$\$

Point 4 Data Corp. has raised \$2.1 million in equity capital, which will be used for repayment of short-term debt and working capital for an anticipated expansion in marketing efforts.

\$\$\$

Pencent, Inc. has completed a second round of financing totaling \$2.5 million.

\$\$\$

Scientific Computers, Inc. has announced an increased quarterly dividend of six cents rather than five cents per share on its common stock payable Oct. 9 to shareholders of record on Sept. 16.

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Supershorts

The General Electric Foundation has made a three-year pledge of \$150,000 in support of Lehigh University's computer-aided design and computer-aided manufacturing program. The Koppers Co. Foundations, Inc. has pledged \$50,000 to the same cause.

announced the delivery of its 10,000th Trident T50 pack disk drive. The drive was received by Texas Instruments, Inc. and will be integrated into a DS990 Commercial Business System.

Wang president Dr. An Wang in a ceremony at Wang Laboratories, Inc.'s headquarters in Lowell, Mass.

division will consist of the Transportation Products Unit and the Business Products Unit.

The one-millionth 8-in. floppy disk drive to come off Shugart Associates, Inc.'s assembly line was presented to

Harold H. Connor, vice-president, has announced the formation of a new operating division of Computer Task Group, Inc., which will be known as the Application Products Division. The new

McDonnell Douglas Automation Co. has doubled the batch computing capacity of its Cyber service in St. Louis by installing another large Control Data Corp. mainframe, a Cyber 176.

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MARTIN MARIETTA DATA SYSTEMS

More Seen Made Abroad

(Continued from Page 57) the use of lower cost labor available in developing countries.

Choosing the most appropriate country for a company's operations is vital for a successful offshore strategy, according to Joseph T. DiBene, president of Technical Resources International of Malibu, Calif.

He said the countries to be considered fell into two groups: those with a successful track record in foreign manufacturing and that are well known and those countries that are going to be the next wave.

"The well-known countries usually no longer offer the lowest cost. On the other hand, they offer know-how and an able partnership in the business of offshore manufacturing," DiBene said.

The lesser known countries usually offer lower cost and a less structured environment," according to DiBene.

Chip Design Detailed

(Continued from Page 57) vision at East Fishkill, N.Y. In memory, the effect is expected to transform a 20 nsec, 2- to 3W chip into a 12 nsec, 1½W chip, while density could be doubled from 1,024 bytes to 2,048 bytes, according to IBM.

Expected Uses

If the engineers are correct, the technique will allow development of novel large-scale integration circuit designs because high values of capacitance can be achieved without sacrificing large amounts of area. As a result, the experiment can be expected to find pervasive use in both logic and array designs if, as seems likely, the technology proves that saturated transistors can indeed be used in very fast circuits.

By increasing speed and making circuits faster, IBM claimed the new technique will contribute significantly to increasing the processing power of computers.

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By High Taxes, State Control

Exec: DP Industry Hampered in California

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — Burdensome taxation and state government control is hampering the development of the computer and electronics industries in California, attendees at the recent Wescon/81 were told.

Speaking at a professional program session on "California's Favorable Small Business Climate," J. Paul Sutton of Gemini Management Resources, Inc. (GMR) in Los Angeles also claimed the cost of housing in the state presents a critical problem to business and is contributing to the lack of skilled data processing staff in the region.

Citing an opinion survey

carried out by GMR immediately prior to Wescon/81, Sutton ran through a list of grievances most close to the hearts of small business innovators.

The problems cited fell into five categories: taxation, capital formation, enforcement of regulations, manpower and housing.

"In all of the five problem categories researched by us, a common thread seems to exist. It is that there is still too much burdensome taxation and regulatory control exerted by the state government over California's business community," he said.

Sutton said those surveyed wanted a reduction in state inheritance tax and personal income tax. New business

should be granted greater tax deferrals, exemptions or investment credits. Banks should be encouraged to place a specified minimum percentage of their small business loans within their market area.

Turning to the problem of housing, Sutton said the inability of professionals such as computer and electronics engineers from out of state to buy adequate homes was already inhibiting the technical development and production growth in California's aerospace and electronics industry.

"If the proper staffing is not accomplished, the growth of these industries could be seriously reduced or become flat," he warned.

Because of the dire situation in housing, Sutton said nine major aerospace and electronics companies in the South Bay Area of Los Angeles County have formed a consortium to initiate a project to build housing centers appropriate for middle managers in the \$25,000 to \$45,000 annual salary range.

"Any company planning major expansions in its plant or office capacity should consider including in its plans the construction of suitable homes for the management and technical people the expanded activity will need," he argued.

Tax Incentives

Sutton said in the survey that 50% of the respondents

felt it was important to provide tax incentives for developers that include housing in any new industrial building development project.

Although Sutton called for less government intervention at the state level, another speaker in the session said the role of the state government in business assistance will become more important with the demise or cutback in federal programs.

Richard N. Davis, director

at the Center for Business and Economic Research, California State University at Chico added: "What federal government cutbacks will mean is a reduction in programs that offer management and technical assistance directly to businesses as part of specific management and technical assistance programs and a reduction in these services provided through economic development programs."

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The annual examination for the Certificate in Computer Programming (CCP) will be held on December 12, 1981, at selected test centers throughout the world.

Specific requirements for this year's examination are detailed in the "Certificate in Computer Programming Examination Announcement and Study Guide." The study guide and application form for the 1981 examination are available on request from ICCP.

Deadline for Filing Application is October 15, 1981

Please forward the "Certificate in Computer Programming Examination Announcement and Study Guide" along with application and test site list.

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Expansions

Amdax Corp. has announced a major expansion of its research and development facilities. Two new sites opened their doors in September, one near Boca Raton, Fla. and one in Irvine, Calif.

Having acquired 31 acres of land located just north of the LBJ Freeway outside of Dallas, Banctec, Inc. plans to build a corporate headquarters and manufacturing facility, scheduled for occupancy in early 1983.

In response to a growing demand for its advanced technology display computers and information systems, Ontel Corp. has opened an additional 25,000 sq-ft plant at 200 Crossways Park Drive in Woodbury, N.Y.

Decimus Corp., a wholly owned subsidiary of Bank America Corp., has opened a new automated teller machine processing center.

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DataLynx/3270: an interactive 3271-2 bisync emulator that supports two async ports configurable as two CRTs or a CRT and printer. The DataLynx/3270 allows dumb CRTs to emulate the IBM 3277-2 CRT. The CRTs may be connected via *dial-up async* modems, giving dial capability to a 3270 network.

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Executive Corner

• Robert D. Hallock has joined Terminal Data Corp. as president and chief operating officer, effective Sept. 28.

• Harry A. Steinberg, former executive vice-president at the Univac division of the Sperry Corp., has recently joined the board of directors of Magnuson Computer Systems, Inc.

• Telecom Systems Group, Inc. has announced the addition of William C. Brasuell to its staff, as director of western operations.

• Roger L. Evans, previously vice-president of marketing, has been named to the newly created post of executive vice-president at Micom Systems, Inc.

• John R. Finch has been appointed vice-president and general manager at National Semiconductor Corp.

• William E. DeGenaro has been named strategic planning director

for 3M Co.'s electronics and information technologies sector.

• Hazeltine Corp. announced that David E. Kern has joined the company as vice-president of finance and chief financial officer.

• The election of G. Jack Lorenz as executive vice-president of corporate planning for United Telecommunications, Inc., and the appointment of Donald S. Bates as president of the United Telecom Computer Group, was recently announced by the company president, Charles Battey.

• Peter J. Shaw has been named to the newly created position of executive vice-president at Megatek Corp. and Hiram T. French has been promoted to vice-president of marketing at that firm.

• Robert G. Costain has joined Dataquest, Inc. as vice-president of office systems.

• Tri-Data Corp. has appointed Dean McGill vice-president of manufacturing.

• Joseph E. Ducey has been named to the position of vice-president, corporate services, at Carterfone Communications Corp.

• Jack L. Tucker has been appointed vice-president of marketing for Oak Switch Systems, Inc.

• Asa W. Lanum has been named to the position of vice-president of development at Pansophic Systems, Inc.

• Brian M. Chapman has recently been appointed vice-president of Eikonix Corp.

• Bob Hart has been promoted to vice-president of marketing for TRE Semiconductor Equipment Corp.

• Gerald N. Soma has joined Point 4 Data Corp. as vice-president, engineering.

• Marvin G. Norman has joined DMA Systems as vice-president of operations.

• Carl L. Holder has been named vice-president of marketing at Adaptec, Inc.

Orders & Installations

Denelcor, Inc. has received a notice of intent from the Courant Institute of Mathematical Sciences to purchase the HEP computer system valued at \$2.4 million.

Informatics, Inc. has received a software application development contract from Texas Oil and Gas Corp. with an approximate value of \$1.5 million.

Cada Systems Corp. has been selected as the supplier of in-house banking computer/software systems for Independent Bancservices Exchange, Inc., a newly formed national network organization for banking services.

First Interstate Bank of Nevada has awarded Docutel Corp. a contract for 24 Total Teller Series 2300 automated teller machines.

Sperry Univac has received 11 new orders for its System 80 computer from companies including Randall's Food Markets of Houston; Computer Craft Corp. of Deerfield, N.H.; Swanson Farms of Turlock, Calif.; May and Baker, a pharmaceutical house in New Zealand; The Tokyo Development Laboratory of Tokyo; Capital Co. Ltd., also in Japan; Yvrai Furniture S.A. of France; and Cooperative Agricole also of France.

The University of Colorado in Boulder has acquired a copy of Intel Corp.'s System 2000/80 data base management system for use in student training.

Lundy Electronics & Systems, Inc. has received a \$3,453,425 order from the Ford Motor Co. for its Ultra Graf 3-D interactive graphics design workstations, used primarily in computer-aided design and manufacturing systems.

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Multitasking Products Unveiled At Wescon/81

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — Two sets of multitasking products designed to help systems manufacturers improve the productivity of application programmers were unveiled at the recent Wescon/81.

Hunter and Ready, Inc., a new Menlo Park, Calif.-based company specializing in the design of 16-bit microprocessor real-time operating systems, and Intel Corp. introduced products based on the "software in silicon" — firmware — technique now gaining recognition among chip manufacturers.

Hunter and Ready designed its first product, known as Versatile Real-Time Executive (VRTX) 8002, for industrial, scientific and medical applications. The vendor claimed it is a major advance in standardized firmware because it dramatically lowers the cost of using 16-bit microprocessors.

The programmable read-only memory (Prom)-based VRTX/8002 will initially support the Z8002 microprocessor with multitasking and control functions, although Motorola, Inc. and Intel Corp. chips are also be-

ing considered, according to Hunter and Ready.

Hunter and Ready claimed that by incorporating systems functions common to all real-time applications into one package, VRTX eliminates the need for users to write complex system software, thus dramatically reducing overall costs.

The company used the notion of modular software to isolate common functions. In this, a critical factor is what software to put into Prom so that only the core of mechanisms needed to fit essential applications are included. Hunter and Ready believes this concept is only the beginning of a trend that could help overcome the severe programmer shortage.

Colin Hunter, company president, said: "The basic idea behind VRTX is to develop machines that can act as sophisticated amplification devices for human intelligence and effort. As machines get smarter through devices such as ours, the amount of end-user power gets greater and designers will have access to software for smaller amounts of money."

VRTX is available immediately and varies in price between \$300 and

Contracts & Pacts

Xylogics, Inc. has signed an OEM agreement to supply its XL2300 system to DMT Corp.

Ampex Corp. Memory Products Division has awarded a contract to Dynacon Computer of Dynacon Associates, Inc. to develop a sales order administration package.

Prodata Systems House has purchased six System 355 master network processors for Digital Communications Associates, Inc. for Bearings, Inc. With an expanding warehouse system, Bearings will control order processing and inventory control at 200 locations.

Computer Sciences Corp. has been awarded a contract by the U.S. government for a computer-based communications system. The classified contract is valued at \$25 million. Computer Sciences has also re-

ceived an \$11.8 million, three-year contract from the U.S. Naval Air Development Center for the continuation of its engineering, analysis and related services.

Honeywell, Inc. has won an \$85,286 contract with the Department of Defense at Rome Air Development Center to investigate fine line electromigration in integrated circuits.

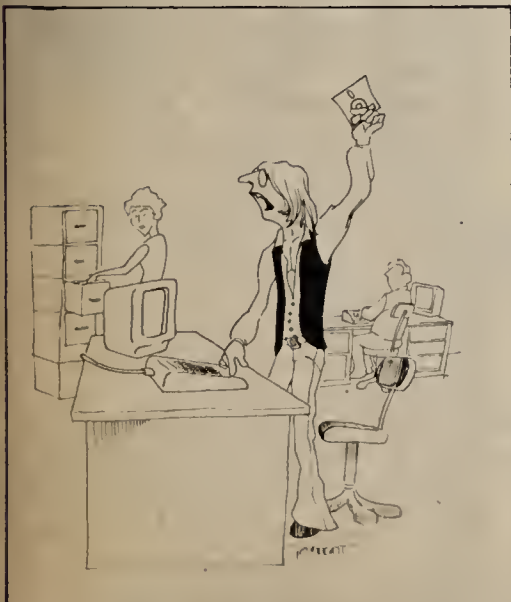
Bancohio Corp. has awarded Quadstar Corp. a development contract to provide statewide automated teller machine support in Ohio on its minihost system.

BDS Corp. and Diablo Systems, Inc. have signed a \$6 million contract for the Diablo Series 600 daisywheel printers.

Data Electronics, Inc. has been selected to provide several million dollars worth of digital cartridge tape drives to International Computers Ltd. of UK. Recent orders for the tape drives at Data Electronics also include one from Altos Computer Systems, Inc. for \$6 million.

A multimillion dollar, nonexclusive agreement to distribute the newly announced Xerox Corp. 820 information processor in the U.S. has been signed by Hamilton/Avnet Electronics, Inc. with Xerox Corp.'s Office Products Division.

Digital Systems Corp. has been awarded a \$4.92 million contract by the U.S. Naval Electronic Systems Command for the development and production of disk memory drive controllers and the integration of the controllers into I/O subsystems using storage module drives.



'Right Now, I'd Like to Play an Old Favorite of Mine, and I Hope One of Yours Too, from the People That Brought You System 52 — Let's Hear if for System 53.'

Vector Out With Vector 2; Gould Announces T12

SAN FRANCISCO — Vector Graphic, Inc. went to Wescon/81 to introduce its Vector 2, a two-model family of technical computer systems aimed specifically at the industrial and scientific markets.

The Vector 2 Model 3100, priced at \$5,795, includes a Z80-based processor and terminal, 1.2M bytes of storage and S-100 bus capabilities. The 3105, with 5M bytes of storage backed by a single 630K-byte floppy disk, costs \$8,495. Availability of both products is immediate.

Also at Wescon with a new product was Gould, Inc., of Santa Clara, Calif., which announced the T12 communicator at the show.

The T12 reportedly allows system engineers to perform fault diagnosis on field-installed products without traveling to the user's site.

The vendor claimed the T12 will also reduce downtime for the customer because until now such a remote diagnostic system depended on obtaining equipment from more than one manufacturer. The T12 is priced at \$3,250.

\$500, according to quantity. There is also a \$1,000 licensing fee.

Intel used Wescon/81 to introduce two operating system processors, the 1APX 86/30 and 1APX 88/30, which include a firmware component — the Intel 80130 — that also incorporates software in silicon. Average or-

der prices for the 86/30 and 88/30 are \$165 and \$125, respectively.

The new products, which extend the base of Intel's 8086 and 8088 microprocessor architectures, were designed for multitasking applications such as transaction processing systems and industrial control.

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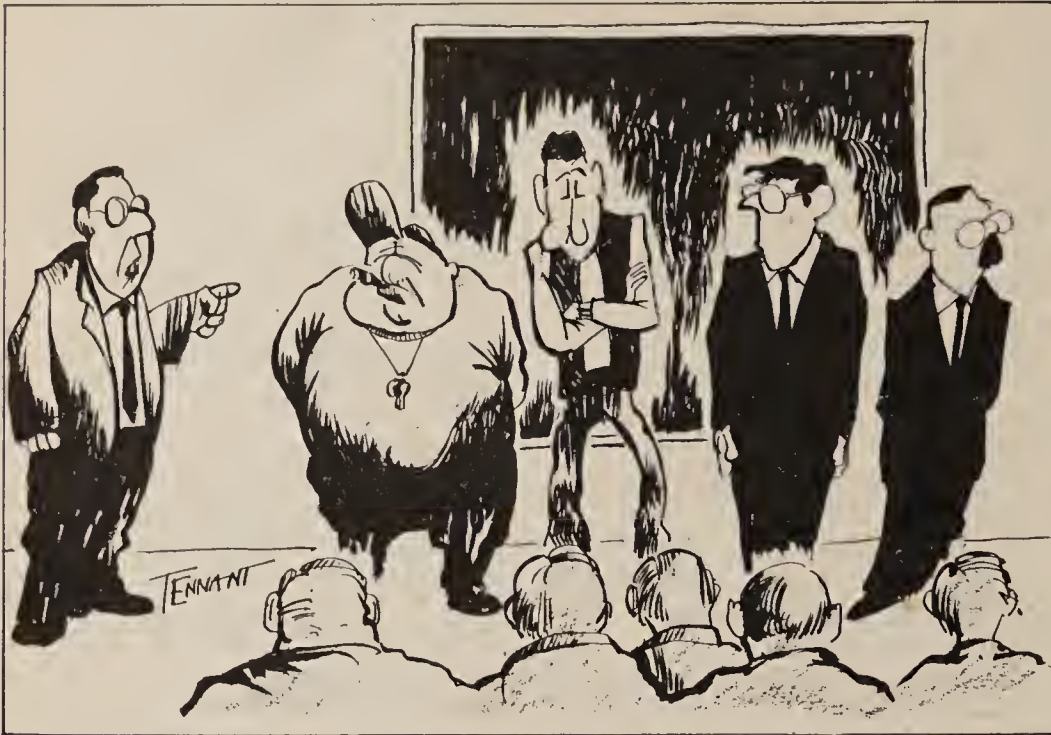
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* A subset of Information System, a program product of the IBM Corporation.



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Mergers & Acquisitions

Schlumberger Ltd. and Applicon, Inc. have reached an agreement in principle for the combination of Applicon with Schlumberger.

National Computer Utility Co. has acquired the assets of the two Tiptop Divisions of Bergen Brunswig Data Service Co., which provide computerized private charge account services to more than 600 retail stores in the New York metropolitan area.

American Management Systems, Inc. has acquired the major assets of Florida Computer Systems Co., valued at \$793,000.

Computer Consoles, Inc. has signed a preliminary agreement with

The Time Machine Ltd., whereby Computer Consoles will acquire 66% of Time Machine.

Dataquest, Inc. has sold its New York Stock Exchange member brokerage subsidiary Dataquest Securities to the newly formed DQ Securities.

The First National Bank of Boston and Tiger Leasing Group, Inc. have reached an agreement in principle under which one of the bank's wholly owned subsidiaries, acting through Randolph Computer Co., will acquire the computer lease portfolio of Tiger Computer.

Foreign Orders & Installations

Control Data Corp. has installed its Cyber 205 system at the United Kingdom Meteorological Office. Seven other Cyber 205s have been ordered by private and public sector computer users overseas as well.

Plantronics/Frederick Electronics Corp. has received two orders totaling more than \$1.4 million, for the manufacturing of its Eltex V telex/data switching equipment for the Egyptian and Nicaraguan telex networks.

Recent orders at Sperry Univac include three from Japan for its \$1.3 million 1100/60 computer system. They were ordered by Ciba-Geigy Japan, Ltd., a medicine/chemical manufacturer; Toyo Kohan Co. Ltd., a tinplate manufacturer; and Takefuji Co., a consumer loan outfit.

Graphics Technology Corp. has been awarded a \$600,000 contract from Mannesmann-Demag, Duisburg, West Germany, for two interactive graphics systems.

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• 14" Screen | <input type="checkbox"/> EXCEL 32
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Salaries commensurate with experience plus 42% Expatriate Premium. Excellent Benefit Plan program including very attractive Savings Plan. Company matches employee contribution—200%/300%-vesting privilege-3 years. American citizens living and working abroad exclude up to \$75,000 of wage and salary income effective 1982 under recently enacted Tax Law.

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Must be thoroughly familiar with Burroughs B-800 series, including remote CRT's, and all applicable languages. Must be flexible and capable of discussing requirements and program alternatives in non-technical terms with lay personnel.

Ideal situation for someone who likes challenge of creating reasonably sophisticated, reliable, customized system for forward looking organization.

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Position opening Spring, 1982, and/or Fall, 1982, at Bloomsburg State College. The School of Business anticipates filling one or more tenured track positions at the rank of Assistant/Associate Professor within the coming year. A terminal degree with course work and dissertation in the appropriate discipline will be required of the successful candidates. A.B.D.'s in the final dissertation phase will be considered. The primary teaching responsibilities will be in the areas of programming and systems science as pertains to the commercial environment. It is expected that candidates will have a thorough knowledge of COBOL and expertise in other areas such as PL/1, RPG II, BASIC, Systems, Communications, and DBMS. Bloomsburg State College is centrally located between New York City and Philadelphia and is situated in a rural, small-town atmosphere. The degree of B.S. Computer & Information Science and B.S. Business Administration/Information Processing is granted by the school. The total enrollment exceeds 450 declared majors and the curriculum is supported by a Univac 1100/21 and a complement of microcomputers. The class size is typically 30 students and the expected schedule consists of 4 sections per semester. Send resume and letter of application to: Mr. Herold Frey, School of Business, Bloomsburg State College, Bloomsburg, PA 17815, by December 10, 1981 (for Spring, '82) or April 15, 1982 (for Fall, '82). An Affirmative Action/Equal Opportunity Employer.

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Michigan Technological University is 9th in the nation in undergrad engineering enrollment and is located in a small town, four season recreation area.

Applicants who can accept state of the art challenges should send a resume to Ken Willems, Manager of Systems Programming, Michigan Technological University, Houghton, MI 49931.

Michigan Technological University is an equal opportunity educational institution / equal opportunity employer.

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Well established software firm with national sales seeks highly skilled RPG II Programmer/Analysts with extensive System/34 experience for medical A/R application. Minimum of three years experience required. Generous profit sharing makes this position a unique career opportunity. Send resume in strictest confidence to:

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Bachelors degree or equivalent classroom hours or work experience with knowledge of programming, systems, and familiarity with an IBM 370 or equivalent computer using DOS type operating system required. Strong management abilities required. Send letter of application, resume, and transcripts of official college education by Oct. 9, 1981 to:

Personnel Department
Prairie State College
202 South Halsted Street
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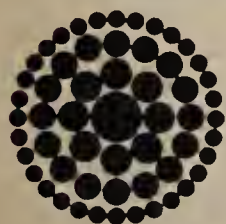
The individuals we choose will participate in the development and maintenance of business oriented computer systems and programs. Candidates must be knowledgeable in ANS COBOL, be degreed, and communicate well. CICS and a varied application background including customer accounting is beneficial. OS is preferred.

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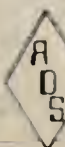
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Applied Data Systems, a well established, progressive software company, is proud of our growth record and would like to make you a part of it.

We are currently seeking Programmer/Analysts with a minimum of 4 years COBOL programming experience, including strong on-line/interactive business applications.

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If growth is a vital concern for your career, PRINCIPALS ONLY, send your resume to Tandem Computers, Attn.-1387, 19333 Vallco Parkway, Cupertino, California 95014. An equal opportunity employer.

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37 1/2 hours per week at \$1,800 per month salary. Design, specify, write, test, document, and debug new computer programs and modify existing programs to process data requirements in an efficient manner. Prepare test programs and write instructions for testing new and existing program modifications including project or request estimations, detailed system design, for use in reduction of production problems. Requires B.S. or M.S. degree in Computer Science. Must have complete knowledge of structured COBOL programming, IMS DB/DC and MFS, OS JCL, VSAM, IBM utility, TCAM MRCS, and problem determination using OS dumps. Apply at Illinois Job Service, Bureau of Employment Security, 910 S. Michigan Ave., Chicago, IL 60605

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\$2,044 Per Month
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Minimum 3 yrs. experience designing and programming on-line commercial systems using Cobol.

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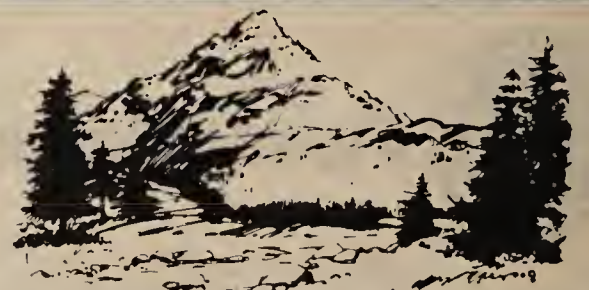
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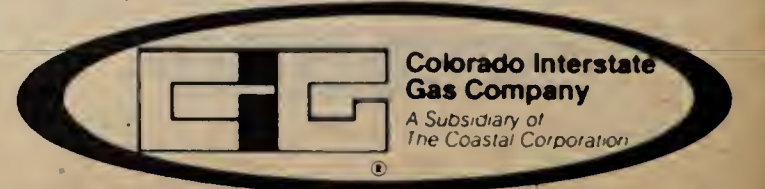
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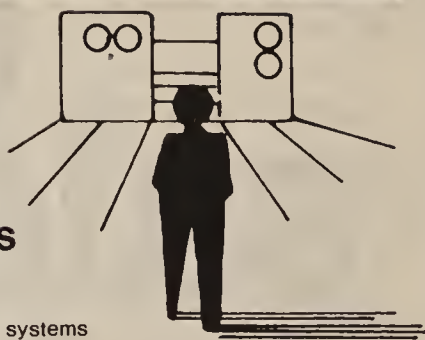
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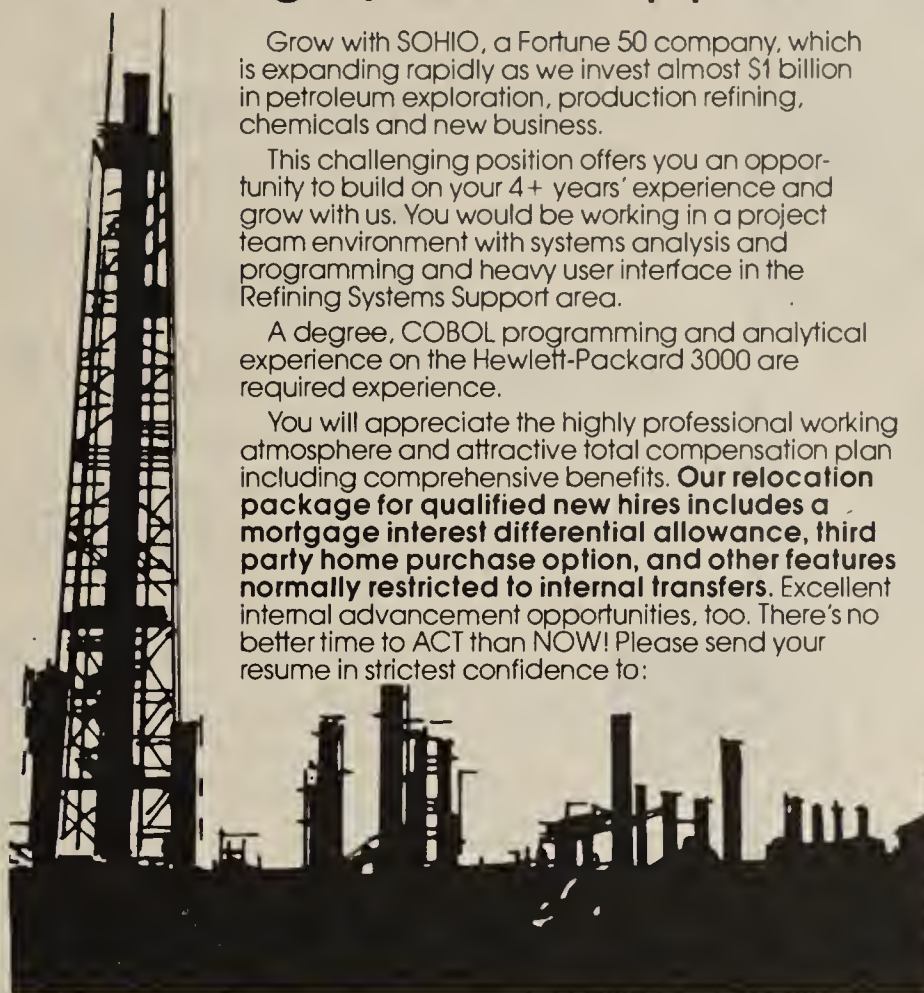
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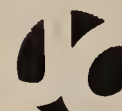
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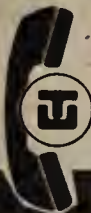
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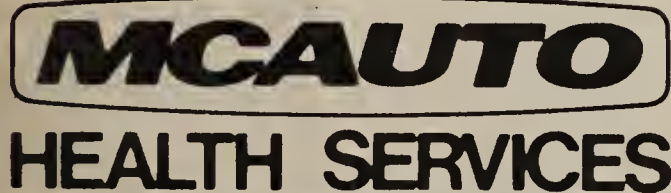
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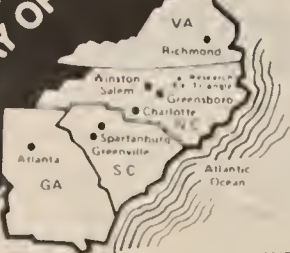
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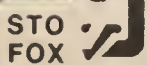
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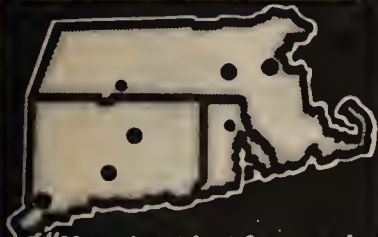
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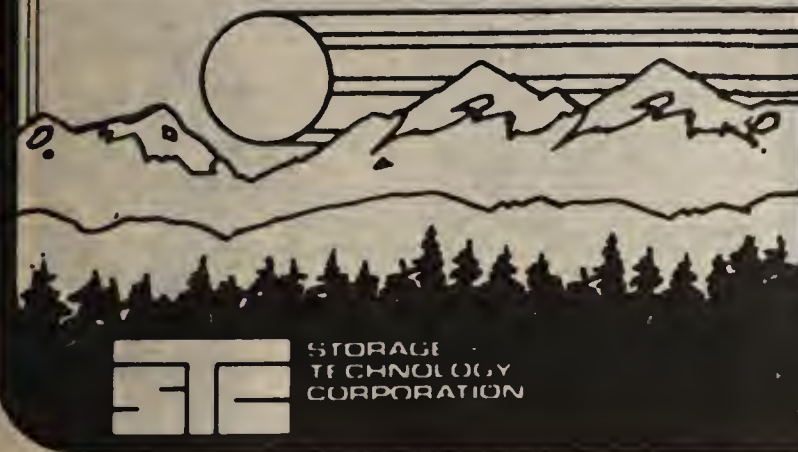
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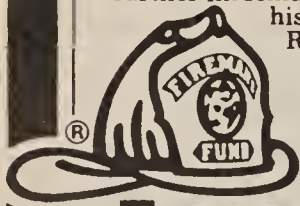
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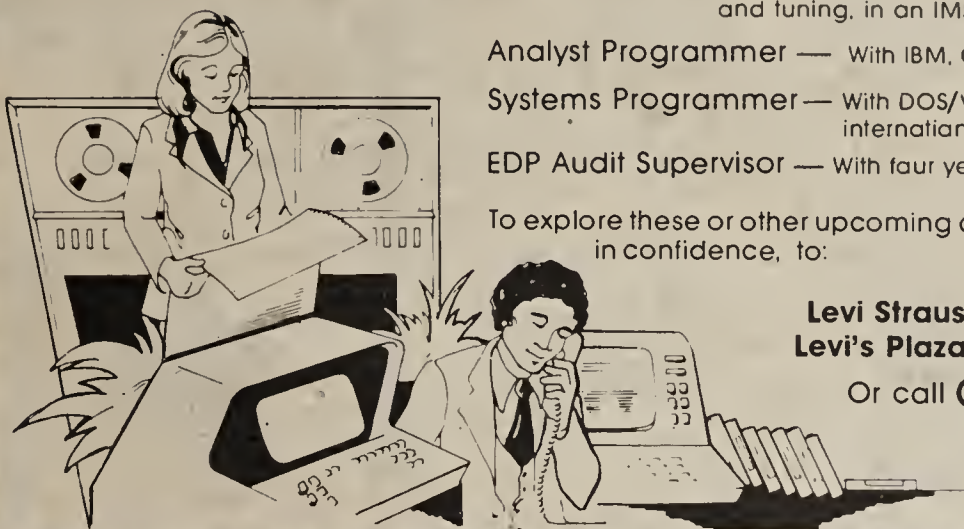
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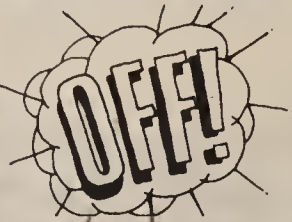
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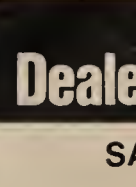
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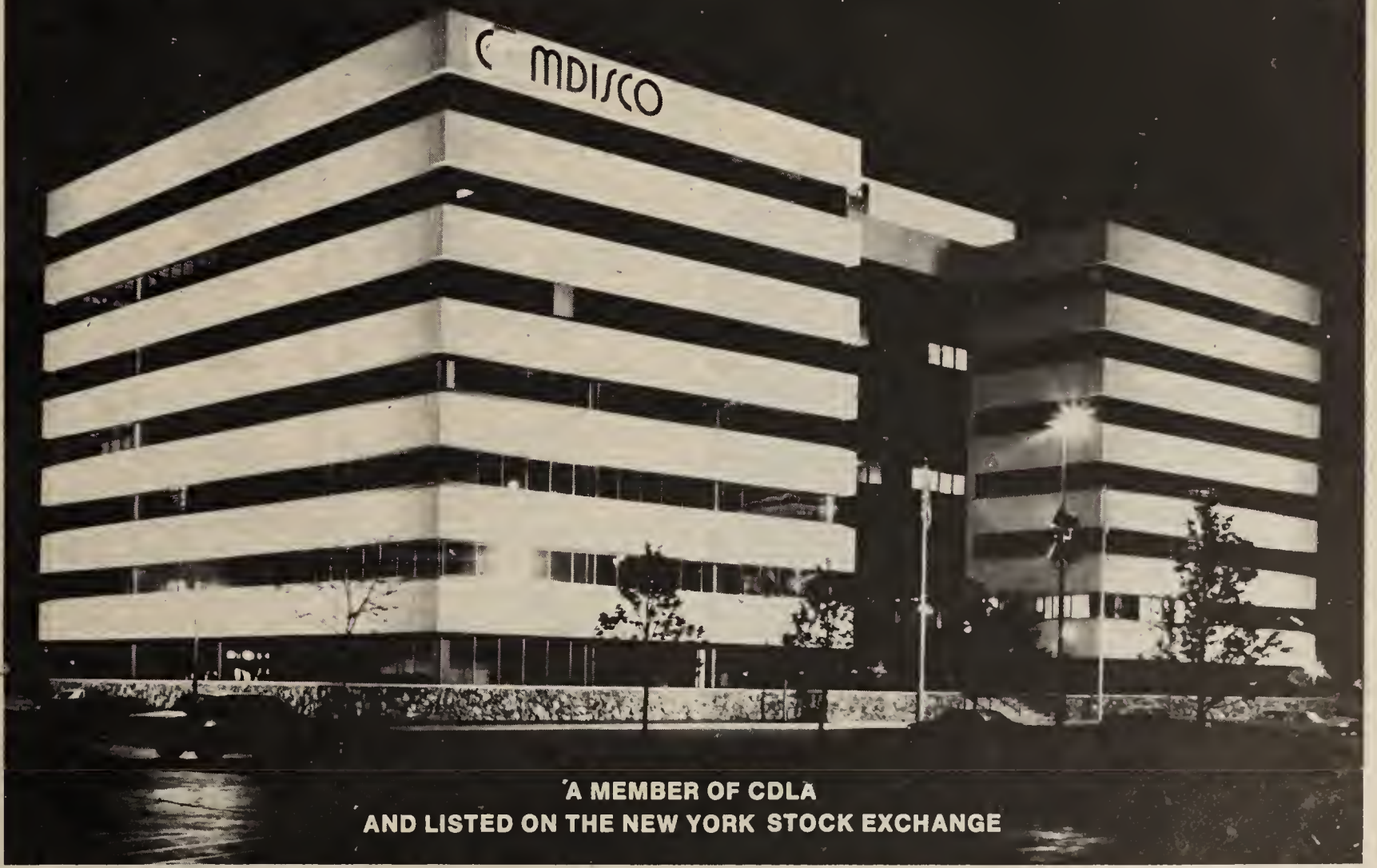
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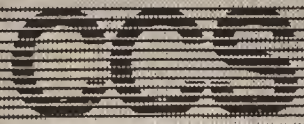
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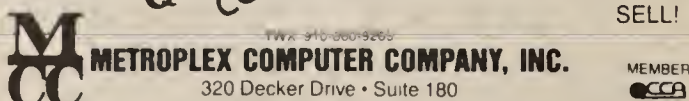
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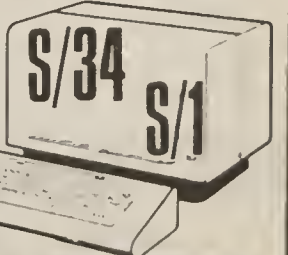
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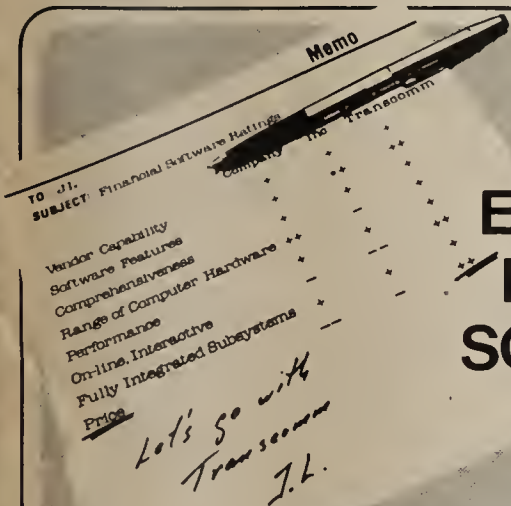
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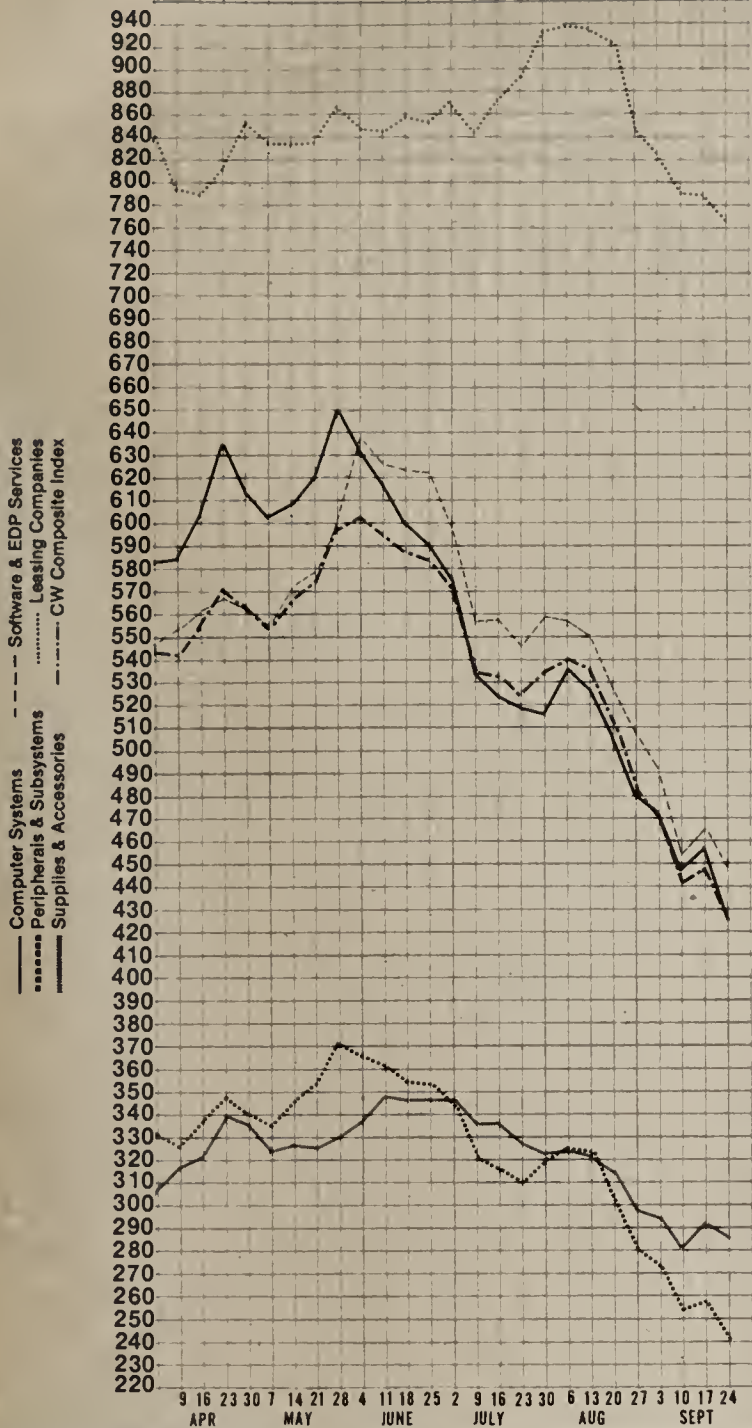


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Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

TRADE QUOTES

CLOSING PRICES WEDNESDAY, SEPTEMBER 23, 1981

E X C H	PRICE				
	1980-81 RANGE (1)	CLOSE SEP 23 1981	WEEK NET CHNGE	WEEK PCT CHNGE	
COMPUTER SYSTEMS					
A	AMDAHL CORP	23-46	26 1/4	-3 1/4	-11.0
N	BURROUGHS CORP	32-72	31 7/8	-1 1/8	-3.4
O	COMPUTER AUTOMATION	10-28	10 1/4	-2 3/4	-21.1
N	CONTROL DATA CORP	60-84	65 1/8	-1 7/8	-2.7
N	CRAY RESEARCH INC	28-49	31 3/4	+ 1/2	+1.5
N	DATA GENERAL CORP	42-87	43 3/4	- 1/4	-0.5
N	DATAPoint CORP	40-68	41 5/8	- 7/8	-2.0
N	DIGITAL EQUIPMENT	80-113	87 1/4	-1 3/4	-1.9
A	ECCO INC	7-19	6 5/8	-1 1/4	-15.8
N	ELECTRONIC ASSOC.	5-13	4 7/8	- 3/4	-13.3
N	FOUR-PHASE SYSTEMS	18-46	28 5/8	+ 3/8	+1.3
N	FOXBORO	44-62	43 5/8	- 3/8	-0.8
O	FULCRUM COMP GRP	1-3	3/4	- 1/4	-25.0
O	GENERAL AUTOMATION	7-16	8 1/2	-1 1/4	-12.8
N	HARRIS CORP	39-60	40 3/4	+ 3/8	+0.9
N	HEWLETT-PACKARD CO	33-54	40 3/4	-1 5/8	-3.8
N	HONEYWELL INC	79-115	79 3/8	-2 1/2	-3.0
N	IBM	54-73	54 1/2	- 3/8	-0.5
O	MAGNUSON COMP SYSTS	14-32	14 1/4	-1 1/2	-9.5
N	MANAGEMENT ASSIST	11-26	11 1/8	-1 3/8	-11.0
O	MINI-COMPUTER SYST	1-4	1	- 1/8	-11.1
N	MODULAR COMPUTER SYST	8-32	9 1/4	-1 1/4	-11.9
N	MOHAWK DATA SCI	12-32	12 1/4	-1 5/8	-11.7
N	NCR	47-76	47 3/8	-2 3/8	-4.7
N	PRIME COMPUTER INC	18-49	18 3/4	-2 7/8	-13.2
N	PERKIN-ELMER	21-36	22 3/4	0	0.0
N	SPERRY CORP	33-65	33	-2 1/8	-6.0
O	TANDEM COMPUTERS INC	13-35	25 1/2	-1 1/4	-4.6
N	TEXAS INSTRUMENTS	84-151	84 1/2	-1 1/8	-1.3
A	WANG LABS.	23-46	23 7/8	- 1/4	-1.0
LEASING COMPANIES					
O	BOOTHE FINANCIAL CP	18-29	21 3/4	-3 3/4	-14.7
N	COMDISCO INC	16-24	17	0	0.0
O	COMMERCE GROUP CORP	1-2	3/4	0	0.0
O	COMPUTER INSTRS GRP	1-4	5/8	0	0.0
O	CONTINENTAL INFO SYS	4-9	5 1/4	- 3/8	-6.6
A	DCL INC	3-4	3 3/8	0	0.0
N	DPF INC	5-12	8 7/8	- 5/8	-6.5
O	ITEL	1-15	1/2	0	0.0
O	LEASPCORP	1-2	3/8	0	0.0
A	PIONEER TEX CORP	2-6	3 1/2	- 3/8	-9.6
N	RELIANCE GROUP INC	65-99	86 1/4	0	0.0
N	U.S. LEASING	18-30	22	- 1/2	-2.2

E X C H	PRICE				
	1980-81 RANGE (1)	CLOSE SEP 23 1981	WEEK NET CHNGE	WEEK PCT CHNGE	
SOFTWARE & EDP SERVICES					
O	ADVANCED COMP TECH	3-8	3 1/2	- 3/8	-8.8
O	ADVANCED SYSTEMS INC	10-15	11 1/4	- 1/4	-2.1
O	ANACOMP INC	13-18	12 5/8	- 1/4	-1.8
O	ANALYTS INTL CORP	3-14	4 3/4	- 1/4	-5.0
A	APPLIED DATA RES.	13-25	13 1/2	0	0.0
N	AUTOMATIC DATA PROC	22-32	24 5/8	-1 1/8	-4.3
O	CGA COMPUTER ASSOC	4-25	4 1/2	- 1/2	-10.0
O	COMPUTER HORIZONS	1-5	2	- 3/4	-27.2
O	COMPUTER NETWORK	4-8	4 1/4	- 1/4	-5.5
N	COMPUTER SCIENCES	15-30	15 1/4	- 1/4	-1.8
O	COMPUTER TASK GROUP	13-23	14	+ 3/4	+5.6
O	COMPUTER USAGE	2-10	2 3/8	- 3/8	-13.8
O	COMSHARE	7-21	7 1/2	- 1/4	-3.2
O	CULLINANE DATABASE	29-89	50	-2 1/2	-4.7
O	DATA DIMENSIONS INC	1-4	3/4	0	0.0
O	DATATAB	2-4	1 7/8	0	0.0
O	DBI CORP	4-8	5 1/2	- 1/4	-4.3
O	DYATRON CORP	5-11	4 3/4	- 1/4	-5.0
N	ELECTRONIC DATA BYST	15-30	22 1/2	+ 1/4	+1.1
O	INFORMATICS INC	17-34	18	-1 1/2	-7.6
O	INSYTE CORP	1-3	2 1/4	- 1/8	-5.2
O	IPS COMPUTER MARKET	1-4	1 3/4	0	0.0
O	KEANE ASSOCIATES	4-6	5 1/2	- 1/4	-4.3
A	LOOICON	23-38	25 3/4	- 1/4	-0.9
O	MNOT SCI AMER INC	17-26	18	-1	-5.2
O	MATHEMATICA INC	12-19	13 1/4	0	0.0
O	MATHEMATICAL APP GRP	15-28	18	0	0.0
O	NATIONAL DATA CORP	14-28	16 3/4	- 3/8	-2.1
N	PLANNING RESEARCH	5-13	5 1/8	0	0.0
O	PROGRAMMING & SYS	1-2	1 3/8	0	0.0
O	RAPIDATA INC	5-11	5 3/8	+ 1/8	+2.3
O	REYNOLDS & REYNOLD	17-28	17	-1 1/4	-6.8
O	SEI CORP	17-28	20 3/4	+ 1/4	+1.2
O	STSC INC	9-28	9 3/4	- 1/4	-2.5
O	SCIENTIFIC COMPUTERS	8-16	8 1/4	- 1/4	-2.9
O	SOFTWARE AG	11-23	12	+1 1/4	+11.6
N	TYMSHARE INC	26-58	27 5/8	-1 1/8	-3.9
A	URS CORP	12-18	12	- 1/8	-1.0
N	WYLY CORP	8-20	8	-1	-11.1
PERIPHERALS & SUBSYSTEMS					
N	AM INTERNATIONAL	8-25	7 1/2	-1 3/8	-15.4
A	ANDERSON JACOBSON	11-26	10 1/2	-1 1/8	-9.6
O	AUTO-TROL TECHNOLOGY	11-62	11	- 3/4	-6.3
O	BEEHIVE INT'L	7-18	6 3/4	- 3/4	-10.0
A	BOLT, BERANEK & NEW	9-25	9 7/8	0	0.0
O	CAMBEX CORP	2-9	2 7/8	- 3/4	-20.6
N	CENTRONICS DATA COMP	7-40	9 1/2	- 1/4	-2.5
A	CETEC CORP	4-9	4	- 1/4	-5.8
O	COMPUTER DEVICES INC	5-10	4 1/2	- 1/2	-10.0
O	COGNITRONICS	5-11	4 5/8	- 3/8	-7.5
O	COMPUTER COMMUN.	1-8	1 1/8	0	-4.9
A	COMPUTER CONSOLES	20-28	20 5/8	-1 3/8	-6.2
O	COMPUTER TRANSCIVER	3-9	6	- 1/4	-4.0
N	COMPUTERVISION CORP	20-49	31 3/4	+1 1/2	+4.9
N	CONRAC CORP	17-28	21 7/8	- 7/8	-3.8

E X C H	PRICE				
	1980-81 RANGE (1)	CLOSE SEP 23 1981	WEEK NET CHNGE	WEEK PCT CHNGE	
SUPPLIES & ACCESSORIES					
A	DATA ACCESS SYSTEMS	5-23	5 1/4	- 3/4	-12.5
A	DATAPRODUCTS CORP	20-44	20 3/8	-2 1/8	-9.4
O	DATUM INC	2-5	1 5/8	- 1/8	-7.1
O	DECISION DATA COMPUT	3-8	2 3/4	- 1/4	-8.3
O	DELTA DATA SYSTEMS	2-4	2 5/8	- 3/4	-22.2
O	DATARAM CORP	5-15	4 7/8	- 3/4	-13.3
N	ELECTRONIC M & M	4-9	3 1/2	- 1/4	-6.8
O	EVANS & BUTHERLAND	18-40	24 3/4	-1 1/4	-4.8
O	FABRI-TEK	2-8	3 1/4	- 1/8	-3.7
O	GENERAL COMPUTER SYS	1-12	5 1/4	- 3/4	-12.5
N	GEN'L DATA COMM IND	8-19	8 7/8	-1 3/8	-13.4
O	GENERAL TERMINAL CP	1-4	1	0	0.0
N	HAZELTINE CORP	20-35	18 7/8	-1	-4.7
O	INFORMATION INTL INC	8-17	8 1/2	-1	-10.5
O	INTEL CORP	24-51	24 1/4	-2 1/4	-8.4
O	IPL SYSTEMS INC	7-15	6 3/4	-1	-12.8
A	LUNDY ELECTRONICS	9-18	9 1/8	- 3/4	-7.5
A	MBI DATA CORP	11-27	14 1/4	-2 3/4	-18.1
N	MEMOREX	8-18	11	-1 1/2	-12.0
O	NETWORK SYSTEMS CORP	15-25	15 3/8	-1 1/8	-6.8
O	OMEX	2-12	12	0	0.0
N	PARADYNE CORP	25-52	34	- 1/8	-0.3
A	PENRIL CORP	9-17	8 3/4	- 3/8	-4.1
O	RAMTEK CORP	10-23	10 1/4	- 7/8	-7.8
N	RECOGNITION EQUIP	7-21	7 3/8	- 1/4	-3.2
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